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AESO/SE  
2-21-96-F-094-R2

August 6, 2003

Colonel James Uken  
Director 56 Range Management Office  
Luke Air Force Base  
7224 North 139<sup>th</sup> Drive  
Luke Air Force Base, Arizona 85309-1420

Dear Colonel Uken:

This document constitutes the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the proposed military training administered by the U.S. Air Force (USAF) on the Barry M. Goldwater Range (BMGR) located in Maricopa, Pima, and Yuma counties, Arizona, and its effects on the Sonoran pronghorn (*Antilocapra americana sonoriensis*)(SOPH) in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (ESA). This revised biological opinion is provided in response to a Memorandum Opinion and Order dated January 7, 2003, from Judge Huvelle of the United States District Court (Court) for the District of Columbia in the case of *Defenders of Wildlife, et al., v. Bruce Babbitt, et al.* (Civil Action No. 99-927 [ESH]).

This biological opinion is based on information supplied in your letter of May 15, 2003, information provided in previous consultation on this action, updated information on the proposed action provided by your agency, new information on the status of the Sonoran pronghorn, telephone conversations, field investigations, and other sources of information as detailed herein. A complete administrative record of this consultation is on file in the Phoenix, Arizona, Ecological Services Field Office.

### CONSULTATION HISTORY

Only key actions in the consultation history are included here for the period prior to issuance of the last revision of this opinion (November 16, 2001). Please refer to the November 16, 2001, and August 27, 1997, opinions for a complete history of the consultation prior to November 16, 2001.

-October 30, 1997. Luke Air Force Base (Luke AFB) sent the Service a biological assessment (BA) with a finding that its activities may affect, but are not likely to adversely affect, the cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*), lesser long-nosed bat (*Leptonycteris curasoae yerbabuena*), and peregrine falcon (*Falco peregrinus anatum*). The Service concurred with Luke AFB's findings for the peregrine falcon and the lesser long-nosed bat. The Service concurred with the findings on the pygmy-owl based on the Luke AFB's commitment to continue pygmy-owl surveys, not destroying any potential habitat, and notifying the Service if pygmy-owls are detected on the BMGR.

-October 5, 1999. Congress passed the Military Lands Withdrawal Act (MLWA). The MLWA established the Marine Corps as the manager for the western half of the BMGR (lands under airspace R-2301W) and the USAF as the manager for military operations on the eastern segment of the BMGR (BMGR-E). The lands are withdrawn from the public for Department of Defense (DoD) purposes until 2024. Before 1999, the USAF managed the entire BMGR with the BLM assigned the land management jurisdiction. This jurisdiction ended on November 6, 2001, and the MLWA initiated resource management pursuant to the Sikes Act. The MLWA also terminated DoD withdrawal of lands at Cabeza Prieta National Wildlife Refuge (NWR). However, the MLWA additionally stipulated that low-level military flights would continue over Cabeza Prieta NWR along corridors mutually designated by the Marine Corps, USAF, and Service, and the electronic instrumentation sites on Cabeza Prieta NWR, used to support military flight training, would also be continued.

-February 12, 2001. In *Defenders of Wildlife, et al. v. Bruce Babbitt, et al.*, the court "ordered that this matter is remanded to Fish and Wildlife Service, which was given 120 days from the date of the Order to reconsider, in consultation with defendants, those portions of the Biological Opinions that have been found to be contrary to the dictates of the Endangered Species Act." The order remanded five biological opinions, including this one, Organ Pipe Cactus National Monument's (NM) General Management Plan, grazing on 5 BLM livestock allotments near Ajo, the Arizona Army National Guard's Western Army National Guard Aviation Training Site (WAATS) expansion project, and military training on BMGR-West conducted or authorized by MCAS-Yuma. The Judge's order also required preparation of supplemental EISs for the Marine's Yuma Training Range Complex (YTRC) and Organ Pipe Cactus NM's General Management Plan, and, in regard to the SOPH recovery plan, required the Service to develop objective, measurable recovery criteria and schedules for implementing recovery actions.

-July 23, 2001. Service personnel met with Luke AFB staff to discuss the remanded biological opinion. The Service presented a brief summary of the current status of the SOPH, detailing the precarious state of the U.S. subpopulation, summarizing the effects of the action, and discussing possible conservation measures for the pronghorn.

-August 8, 2001. Luke AFB sent a letter to the Service detailing conservation measures to be included in their proposed action. The Service met with Luke AFB representatives on October 1, 2001, during which Luke AFB further clarified some aspects of their proposed action and implementation of conservation measures. On October 5, 2001, Major Dan Garcia of Luke AFB sent an e-mail to the Service detailing additional conservation measures to be included in their proposed action. On October 22, 2001, the Service provided a draft biological opinion to Luke AFB for their review. Luke AFB provided comments on the draft opinion to the Service on November 8, 2001.

-November 16, 2001. Revised biological opinions were signed by the Service's Regional Director, Region 2, Albuquerque, New Mexico, for Luke AFB's portion of the BMGR and the other four opinions that were remanded. The Luke AFB opinion concluded that the proposed action was not likely to jeopardize the continued existence of the SOPH. An incidental take statement with terms and conditions for the SOPH was included.

-November 23, 2001. A Record of Decision for the YRTC's supplemental EIS was published in the Federal Register.

-April 11, 2002. A Record of Decision for Organ Pipe Cactus NM's supplemental EIS, re-analyzing cumulative impacts to the SOPH, as directed by court order, was published in the Federal Register.

-September 30, 2002. A revised biological opinion was signed for BLM's proposed livestock grazing on 5 allotments near Ajo.

-November 27, 2002. A Federal Register notice was published in which critical habitat was proposed for the pygmy-owl. Included was critical habitat proposed at Organ Pipe Cactus NM, on BLM lands north of Organ Pipe Cactus NM, and lands on Cabeza Prieta NWR. No lands within the BMGR were proposed for critical habitat.

-January 7, 2003. Judge Ellen Huvelle remanded back to us the November 16, 2001, biological opinion for Organ Pipe Cactus NM's General Management Plan. Judge Huvelle gave us 90 days to produce a biological opinion that was consistent with her previous order of February 12, 2001.

-February 6, 2003. Judge Ellen Huvelle entered a stipulation among the parties to have the FWS revise the Luke AFB, MCAS-Yuma YTRC, and WAATS November 16, 2001, biological opinions consistent with her January 7, 2003 order within 180 days.

-April 7, 2003. In compliance with Judge Huvelle's January 7, 2003, order, a revised biological opinion was signed and delivered to Organ Pipe Cactus NM covering their General Management Plan. The opinion found that the proposed action was not likely to jeopardize the continued existence of the SOPH. No incidental take of listed animals was anticipated.

-May 15, 2003. Luke AFB sent the Service a letter concerning updates to their proposed action for the court stipulation of February 6, 2003.

-July 2, 2003. We e-mailed a draft version of the proposed action to Luke AFB for their review and comment.

-July 16, 2003. We delivered a draft biological opinion to the USAF addressing proposed military training administered by the USAF on the BMGR.

-July 28, 2003. We received comments on the draft biological opinion from the USAF.

## **BIOLOGICAL OPINION**

### **I. DESCRIPTION OF PROPOSED ACTION**

#### **Proposed Action**

The following description of the proposed action is based primarily on Luke AFB (2001, 2003). (Figures and Tables referred to herein can be found at the end of this document or in the cited documents.)

The only expected significant change in use patterns on the BMGR-E of the BMGR is an approximately 10 percent increase in aircraft night operations. These night operations will occur between official sunset and 2330 hours Monday through Friday. Projected use may increase the range utilization rate from 49 percent to approximately 60 percent. No changes in the area of land impacted by military activities are expected.

The BMGR is the nation's second largest aerial gunnery training range with a restricted airspace overlying 2,766,670 acres, of which 1,733,921 acres ( 2,709 square miles) of land area are within the range. The BMGR has been used for developing and maintaining the combat readiness of the tactical air forces of the USAF, Marine Corps, Navy, and Army. The environmental management of the range changed from the BLM to the USAF and Marine Corps under the MLWA. Military activities (restricted airspace) overlap in approximately 822,000 acres of Cabeza Prieta NWR, which under the MLWA of 1999, is no longer part of BMGR, are limited to use of airspace and operation of four Air Combat Maneuvering Instrumentation sites. Air-to-ground training operations occur only outside of Cabeza Prieta NWR. The USAF, Western Army National Guard Aviation Training Site (WAATS), and Navy/Marine Corps are the three

principal agencies that use the BMGR for combat aircrew training. However, any other DoD entity can also use the BMGR and such use is contingent upon completion of appropriate environmental documentation. The eastern part of the BMGR is known as the BMGR-E, and the military manager is the USAF. The airspace and lands are under the jurisdiction of the 56<sup>th</sup> Fighter Wing at Luke AFB. Also, we note that the MLWA directed DoD to prepare and implement an Integrated Natural Resources Management Plan (INRMP) for the BMGR in accordance with the Sikes Act. This INRMP is scheduled for completion this year and will be the subject of future section 7 consultation. The term of the proposed action addressed herein does not have an end point. Luke AFB will reinitiate consultation as needed pursuant to 50 CFR 402.16.

Military activities occurring within the BMGR-E include use of airspace, four manned air-to-ground ranges, three tactical air-to-ground target areas (East TAC, North TAC, and South TAC), six auxiliary airfields (AUX-6, AUX-7, AUX-8, AUX-9, AUX-10, and AUX-11), Gila Bend Air Force Auxiliary Field (AFAF), Stoval Airfield, and explosive ordnance disposal areas. (Figure 1.)

Luke AFB manages use of the BMGR-E of the BMGR. Regular users of the BMGR-E include the USAF's 56<sup>th</sup> Fighter Wing, Luke AFB, Arizona; the 944<sup>th</sup> Fighter Wing (Air Force Reserve Command), Luke AFB, Arizona; the 355<sup>th</sup> Wing, Davis-Monthan AFB, Arizona; the 162<sup>nd</sup> Fighter Wing (Air National Guard), Tucson International Airport, Arizona; the 305<sup>th</sup> Rescue Squadron and 79<sup>th</sup> Rescue Squadron (Air Force Reserve Command), Davis Monthan AFB, Arizona; Air National Guard SNOWBIRD program, Davis Monthan AFB, Arizona; and the ARNG's WAATS and the 1/285<sup>th</sup> Attack Helicopter Battalion, Silver Bell Heliport, Marana, Arizona. These units account for approximately 90 percent of the total use of the BMGR-E. The remaining use of the BMGR-E of the BMGR is accounted for by USAF Reserve units from other states; by Marine Corps and Navy units throughout the continental United States, Hawaii, and the Atlantic and Pacific fleets; by numerous transient military units from northern locations during winter months when their operations are hindered by weather; and aircrews of allied nations for which the U.S. government has agreed to provide fighter pilot training and large multiple unit exercise or special operations. Ranges on the BMGR-E of the BMGR are typically available from 0700-2300 hours, Monday through Friday, and 0800-1700 hours on two weekends per month, except on Federal holidays.

Three blocks of Federal Aviation Administration (FAA) designated restricted airspace, R-2301E, R-2304, and R-2305, overlie the majority of the BMGR-E. The USAF range and target installations within these blocks include: Air-to-Air Range, used for air combat training; Manned Ranges 1-4, used to train pilots in precision air-to-ground delivery of practice, conventional ordnance, and special weapons; and the North, South, and East TACs, designed to simulate targets of opportunity for air-to-ground firing.

In fiscal year 2002, 51,425 sorties (one sortie equals a take-off and a landing by one aircraft) were flown within R-2301E, R-2304, and R-2305 as follows:

- F-16s: 67 percent
- A-10s: 23 percent
- Helicopters <1 percent
- The remaining nine percent includes up to 57 different types of aircraft (mainly mixed wing) flown by a variety of users (e.g. Marine Corps, Arizona Game and Fish Department, Border Patrol, U.S. Customs Service, U.S. Drug Enforcement Agency, etc.

In fiscal year 1996, 61,895 sorties were flown in those three airspaces. In addition, 10,975 sorties were flown in R-2301W, for a total of 72,870 sorties in BMGR airspace by 44 types of aircraft. The vast majority of these, 42,277 sorties, were flown in R-2301E in 1995, and 52,480 were flown in 1996. Of all airspace use on the BMGR-E in fiscal year 1995, F-16s accounted for approximately 67 percent of the sorties. A-10s were the second most frequent users and accounted for approximately 23 percent of the sorties. Helicopters of all types accounted for approximately one percent of the total sorties. Most helicopter flights (55 percent) occurred over R-2305 (Manned Range 3) and R-2304 (East TAC). Small fixed-wing aircraft accounted for less than 0.4 percent of the sorties. No major seasonal patterns of range use occur. However, each tactical range is normally closed to live-fire activity for about two months annually for maintenance and clearance by explosive ordnance disposal (EOD) personnel. Increased use by transient units during winter months more or less compensates for days lost to maintenance and holidays. Thus, a slightly greater amount of daily activity occurs in winter but on a smaller percentage of days. The fiscal year 2002 BMGR Range Utilization Report shows that for the record year there were approximately 23,325 sorties on the three TACs. Of these sorties, the USAF conducted approximately 90 percent, the ARNG < 1 percent, and the Marine Corps approximately 6 percent; the remaining 3-4 percent includes a variety of users which include AGFD, Border Patrol, U.S. Customs, Drug Enforcement Agency, etc.

In the YTRC draft supplemental EIS, two USAF Military Training Routes (MTR), VR244 and VR260, cross Cabeza Prieta NWR. VR244 is 18 miles long and 4 miles wide. VR260 is 16 miles long and 4 miles wide. Authorized altitudes within these routes are 1,500 to 3,000 feet above ground level (AGL). In fiscal year 1995, a total of 376 sorties were made in VR244. All flights were low-level navigation or Low Altitude Navigation and Targeting Infrared for Night (LANTIRN) missions flown by USAF, Navy, or Marine fighter or attack aircraft except for two sorties for low altitude navigation by C-130s and two sorties by Cessnas for route reconnaissance. At an average speed of 420 knots, a flight of aircraft covers the 18 miles of VR244 over Cabeza Prieta NWR in about 2.6 minutes. At this speed, the 122 flights spent a combined total of approximately 4.5 hours (268 minutes) at low altitude over Cabeza Prieta NWR in fiscal year 1995. In the same year, a total of approximately 609 sorties were made in VR260. Approximately 85 percent of the sorties made through VR260 were by F-16s and other high performance attack aircraft and approximately 15 percent were by A-10s. At an average

speed of 480 knots, a flight of high performance attack aircraft covers the 16 miles of VR260 over Cabeza Prieta NWR in about 2.0 minutes. At an average speed of 340 knots, a flight of A-10s covers the 16 miles of VR260 over Cabeza Prieta NWR in about 2.8 minutes. Thus, the total amount of time spent over Cabeza Prieta NWR in VR260 in fiscal year 1995 was approximately 16.5 hours (992 minutes). No helicopters used VR244 or VR260 in fiscal year 1995.

In the 2001 BO for Luke AFB, aircraft sortie utilization rates for each of the tactical ranges (TACs) were broken down into three categories: day, night, and total. A review of these rates by Luke AFB shows that the utilization rates have changed and in the last 12 months. There has been a 6.8 percent increase in night missions over North TAC and South TAC, with an overall increase for the three TACs of 4.9 percent. The number of night missions involving live ordnance remains at 5 percent with 90 percent occurring on East TAC which is located outside of current SOPH habitat.

### **Air-to-Air Range**

The Air-to-Air Range lies entirely within R-2301E and consists of two flight training ranges, Air-to-Air High and Air-to-Air Low, each with assigned vertical and lateral airspace and surface boundaries. Air-to-Air High Range has a designated floor altitude of 11,000 feet and a ceiling altitude of 80,000 feet. Air-to-Air Low Range has an assigned altitude of surface to 10,000 feet, except for portions overlying Cabeza Prieta NWR, where by agreement with Cabeza Prieta NWR a minimum altitude of 1,500 feet AGL is observed even though the airspace is authorized for use to the surface. A variety of altitude blocks occur during Air Combat Maneuvering Instrumentation training depending on the nature of the activity and standard Air-to-Air High and Air-to-Air Low altitude restrictions.

Air-to-air target practice ammunition is used by F-16s of the Tucson Air National Guard utilizing the Agates target system and UH-60s of the U.S. Customs Service using a towed-banner target system. A total of 329 live fire air-to-air sorties were flown in 1995, all within the live aerial gunnery range. Except for the Agate target system, no towed darts are currently used on BMGR, though use of towed targets is authorized. Aircraft involved in air-to-air gunnery typically fire 100 rounds of ammunition. All ammunition is not necessarily expended during each sortie; thus a maximum of 32,900 rounds of ammunition were used in 1995.

A progression of non-firing training missions occurs on all Air-to-Air Ranges. Each level of training contains a series of air combat maneuvers that sequentially increase in degree of difficulty and required skill level of pilots. These programs, listed in order of most fundamental to the most complex include: basic flight maneuvers including turning, climbing, and descending; intercepts, where two aircraft on a common flight vector maneuver for identification of friendly/enemy aircraft; air combat maneuvers; air combat tactics which combine air combat maneuvers with simulated combat; and dissimilar types of aircraft in simulated combat. Live aerial gunnery is permitted only within a designated area along the western end of R-2301E. At present, only the 162nd Fighter Wing, Tucson Air National Guard, practices live air-to-air

gunnery on the BMGR-E using the Agates target system. A total of 329 aerial gunnery sorties were flown in 1995 but no live ordnance was fired in the last year and does not plan to do so in the near future. An alternate live aerial gunnery range is located south of the primary range over the Cabeza Prieta NWR but can be scheduled for use only under special operational considerations. The alternate live aerial gunnery range has not been used for several years.

Air Combat Maneuvering and Instrumentation (ACMI) is used for simulated air-to-air combat training between friendly and simulated enemy fighter aircraft to improve aircrew combat maneuvering, tactics, and techniques. ACMI is a computerized telemetry/instrumentation system that monitors the relative positions and flight data of all aircraft engaged in a training mission. ACMI tracking sites, which are located on selected mountains around the BMGR, follow aircraft in simulated combat and transmit flight data to the ACMI range master tracking instrumentation substation located on Childs Mountain north of Ajo. Combat activity is displayed via video simulation for in-flight advisory comment and recorded for post-mission performance evaluation.

### **Aircraft Crashes, Rescues, and Clean Up**

Inadvertent or emergency jettisons of any external stores outside of target areas are rare and crashes of aircraft have averaged less than two per year on the BMGR-E of the BMGR. However, crashes are followed up with emergency rescue operations and then crash clean up. Rescue and clean up typically require ground and/or air operations, often in remote areas.

### **Manned Ranges 1-4**

Manned Ranges 1, 2, 3, and 4 are used for delivery of simulated conventional and special weapons. Ranges 1, 2, and 4 lie within Range R-2301E; Manned Range 3 lies within R-2305. Manned ranges are under direct operational control of a range control officer. Personnel are stationed in the main tower and ground shack near the target for the purpose of scoring the accuracy of a weapons delivery using inert practice weapons with small spotting charges. Some are scored on a hit or miss basis; others are scored electronically showing degrees of accuracy. A combination of five target types, tactical strafe, strafe, bomb/rocket circle, special weapons delivery, and applied tactics orientation, comprise the manned target complex. Each target is approached at different airspeeds, angles, and altitudes by the attack aircraft. Range control officers are also responsible for controlling aircraft and ground activities on the range.

All manned ranges have night operations capability for conventional ground attack maneuvers. The use of airborne flares, smudge pots, and lighted run-in lines facilitate night operations. Target hits are scored either by triangular reference to the flash emanating from the ignition of practice ordnance on contact or by the Acoustiscore System (noise-activated system for scoring ordnance delivery).

Manned ranges are periodically closed for maintenance and munitions clearance activities by EOD personnel. Each tactical range is closed for a period of approximately eight weeks each

year for range maintenance and EOD clearance. Currently scheduled maintenance periods are October to December for South TAC, January to March for North TAC, and March to May for East TAC. During annual maintenance prior to August 2001, an area 1,000 feet in radius from the edge of each target and 100 feet on each side of access ways was cleared. Every five years, clearance extended to one nautical mile from the outer edge of each target or until fewer than five complete ordnance items per acre were found, whichever was less. Since August 2001, new criteria reduced the annual radius, from 1000 feet to 100 feet on each side of access ways. Most significantly, the five-year radius was reduced from one nautical mile to the lesser of 3280 feet or a density of five items per acre. These new criteria substantially reduce the land area covered by EOD operations (Colonel J. Uken, USAF, pers. comm. 2001).

### **Tactical Ranges**

Three tactical ranges, North, South, and East TAC are present on the BMGR-E. These ranges are unmanned, diverse target complexes for air-to-ground firing that simulate combat staging areas. North and South TAC lie under the Air-to-Air High Range and are close to Manned Ranges 1, 2, and 4; South TAC abuts the ground boundary of the Air-to-Air Low Range. Training missions on adjacent ranges and targets require flights within North and South TAC to be confined to specific airspace (surface to 24,000 feet) and to be responsive to other range training schedules. East TAC is located in the northeastern corner of the BMGR-E and underlies R-2304 airspace with range air space extending from the surface to 24,000 feet.

North and South TAC present a composite of simulated combat target features that include: airfields with aircraft in revetments, on taxiways and runways, as well as control towers, hangars, and administrative buildings; field artillery batteries and missile launchers; truck convoys; railroad yards with trains; friendly/enemy tank groups and regiments; Maverick missile training targets (plywood and real tanks); simulated SCUD Launchers and ZSU23-4 anti-aircraft artillery; high explosive hills (targets for live high explosive bombs and rockets); and surface-to-air missile (SAM) sites with re-vetted missiles and associated radar equipment. Many targets are constructed of plywood and other common construction materials. Exceptions are simulated trains, convoys, buildings, and combat vehicles, that are made up of salvaged tanks, trucks, buses, jeeps, Sealand cargo containers and combat vehicles. The configuration and type of targets used can change when new combat scenarios require different target configurations. New targets are also continually added to replace old ones. Salvaged vehicles positioned on the TACs are pre-conditioned by removal of all lubricants and coolants before being used as targets.

Simulated combat and target features located on East TAC include: an airfield complex with runway, hangars, revetments, and storage buildings; SAM missile sites with re-vetted missiles and associated radar equipment; an intercontinental ballistic missile site consisting of a covered silo and associated buildings; a railroad yard with warehouse and simulated train; a single span bridge crossing a dry wash; enemy radar sites with re-vetted missiles; tanks and trucks randomly spaced along dirt roads; randomly spaced artillery pieces serving as heavy artillery for a forward battle staging area; forward battle area with friendly and enemy tanks deployed, mobile SAM

unit artillery, and ZSU23/4 anti-aircraft artillery; Maverick missile training targets; high explosive ordnance hill; and enemy command centers containing antennae and automatic weapons. Other non-target, support combat features on East TAC include NATO Hill, an observation hill with helicopter landing pad, and water wells. East TAC is outside current SOPH habitat.

Authorized ordnance for delivery at selected North, South, and East TAC targets include gun/cannon ammunition, white phosphorus spotting rockets, inert bombs, high explosive bombs and rockets, and live Maverick and Hellfire missiles. A small amount of live ordnance is used at night on BMGR tactical ranges. Fewer than five percent of missions involve night use of live ordnance and approximately 90 percent of such night missions are flown into East TAC due to SOPH clearance requirements. At times when East TAC is not available, North TAC is the preferred range, and South TAC is least preferred. In FY 02, tactical ranges were available for a total of 10,217 hours combined day and night use. The tactical utilization rates were: daytime 61.5 percent, nighttime 47.9 percent, combined total 58.1 percent.

	<u>NTAC</u>	<u>STAC</u>	<u>ETAC</u>
Day	69.3%	67.8%	59.8%
Night	47.5%	45.8%	42.6%
Total	63.3%	61.4%	54.7%

(from Range Utilization Spreadsheets for FY02 [RMO Common - Metrics folder])

A total of 764 sorties involving live bombs were flown on North and South TAC in 2002 by USAF planes. Typically an average of four bombs are dropped by each plane on one pass. A total of 114 sorties involving live Maverick missile firings on the target on North TAC were flown in 1995. In 1996, 74 Maverick missile firings occurred on North, South and East TACs. A total of 12 sorties involving live Maverick missile firings on the target in North TAC were flown in 2002.

At least two sites for Ground Forward Air Controllers are located on all ranges and are used in controlling aircraft for missions such as Close Air Support. The ranges are also used with Electronic Warfare equipment and Smokey SAM rockets to simulate enemy air defense for conducting training. A variety of anti-aircraft armament, SAM, and missile jamming systems can be deployed for units to employ electronic countermeasures, chaff (small fibers that reflect radar signals and temporarily hide aircraft from radar detection), and radar warning receiver equipment tactics.

Each tactical range contains one HE Hill, where live, general purpose bombs and rockets are used. East TAC also has one live Maverick missile target. In 1996, an average of 131 live bombs per month was dropped on the three tactical ranges combined. All ordnance expenditures were made on high explosive hills between 0700 and 2200 hours. Approximately 36 Maverick

missiles per year are fired on East TAC. The Maverick missile target on North TAC was dismantled in 2003.

Both the Air-to-Air and Air-to-Ground ranges allow the use of chaff and self-protection infrared decoy flares, expended in accordance with USAF regulations. Typically, Air-to-Air missions use more chaff and flares than Air-to-Ground missions with an average of 15 chaff and 10 flares deployed per aircraft per sortie. Night-time illumination flares are also used during night Air-to-Ground operations on all tactical ranges and occasionally on the manned ranges. Three to eight illumination flares are normally deployed per mission. Missions using illumination flares account for about 20-30 percent of all night missions and are generally used by A-10 aircraft, though other aircraft use them.

Airborne and ground-based target identification lasers are used occasionally on the tactical ranges and manned ranges. Controlled use consists of aiming a laser light at a target and either providing the aircrew with the location of the target or providing a laser guided bomb to find the target.

Currently, the USAF has towers set up around the HE Hills in South and North TAC for monitoring purposes. The USAF funds 5 biologists for monitoring purposes. These biologists survey the HE Hills from the towers (or other vantage points) before deliverance of live ordnance to determine if SOPH are in the area. If SOPH are detected, the mission is moved or cancelled. The maximum time allowed between missions is two hours. If subsequent missions occur after a two-hour time period, another SOPH survey and clearance is required.(see Appendix 1).

Monitoring is conducted on the North TAC and South TAC with limited monitoring on Manned Range 1 (i.e., the day following a SOPH sighting on Manned Range 1). Monitoring includes visual observations with the aid of binoculars and spotting scopes, as well as telemetry surveillance to locate collared SOPH. Monitoring is done prior to live ordnance missions (Live Monitoring), every Monday and the day after SOPH are located on a range (Required Monitoring), prior to Maverick missions (MAV Monitoring), and prior to EOD detonations (EOD Dets Monitoring).

If a SOPH is located within a 3.1 mile radius (i.e., safety zone) of HE hill, no high explosive ordnance deliveries are authorized on the affected target(s). In addition, no deliveries of any kind are authorized on targets within 1.86 mile radius of any SOPH location for the remainder of the day (2400 hrs.). When animals are located, basic biological information is collected and reported to 56 RMO using report form 56 RMO Operating Instruction 1-1 Sonoran Pronghorn Daily Monitoring Report. The data collected includes location of sighting, UTM coordinates, activity when sighted, number and composition of herd, number of fawns; and last known direction of travel.

Strict compliance with the November 16, 2001, biological opinion is adhered to in all aspects of the monitoring activities. The protection of the SOPH on the BMGR is paramount and several

steps have been taken to evaluate and minimize potential impacts of USAF activities on this subspecies. Monitors work together and with other range personnel to ensure all personnel are aware of SOPH locations in an effort to minimize disturbance. In 2002, there were eight range incidents that required follow-up by the monitors. In addition, if any SOPH mortalities are reported on BMGR-E, the SOPH Recovery Team lead is notified and a site visit is arranged within 24 hours of the report. To date, there have been no documented SOPH mortalities as a result of AF operations.

### **Gila Bend AFAF**

Gila Bend Air Force Auxiliary Field is located outside the northeastern corner of BMGR-E and is outside of SOPH habitat. Gila Bend AFAF includes a fixed-wing aircraft runway and a heliport. The runway is used for emergency or precautionary recoveries of military aircraft that malfunction or are damaged during operations on the BMGR. The runway is also used daily by aircraft performing overhead approaches and patterns. The 6-pad heliport is used routinely to support Army National Guard training operations. No aircraft are permanently based at Gila Bend.

### **Auxiliary Airfields**

Six abandoned auxiliary airfields, AUX-6, 7, 8, 9, 10, 11, are present on BMGR-E. Each of these airfields consists of a triangular configuration of runways on a 500 to 700-acre tract. AUX-8 and AUX-10 are no longer used for any military activities. AUX-7 is part of the Manned Range 1 complex. AUX-9 is part of the Manned Range 2 complex and is used as a munitions consolidation point. AUX-11 is used by the Marine Corps during WTI and is also the Manned Range 4 munitions consolidation point. AUX-6 is mainly used for U.S. Air Force Academy jump (parachute) training and as a refueling and staging area for rotary-winged aircraft by WAATS and the 1/285th Attack Helicopter Battalion; other uses may occur as the military mission evolves.

### **Stoval Airfield**

Stoval Airfield is an abandoned auxiliary airfield located in the extreme northwestern corner of the BMGR-E and is inside SOPH habitat. This airfield is not currently used by the USAF, but the USAF authorizes use by the Marines Corps for helicopter refueling and rearming and limited C-130 aircraft operations during spring and fall training exercises.

### **Explosives Ordnance Disposal**

EOD personnel destroy dangerous unexploded ordnance on the ranges being cleared. The remaining scrap metal, along with recyclable scrap metal from target vehicles, is taken to one of four consolidation points where it is processed for recycling. Processing includes cutting, grinding, crushing, flash-burning, and other processes to reduce the physical size of materials and

to neutralize any energetic residues. These consolidation points are 3-5 acre cleared sites surrounded by a ten-foot-high chain link fence. One site serves Manned Range 1 and North and South TACs. Another located on AUX 9 serves Manned Range 2. A third, located on AUX 11, serves Manned Range 4. A fourth serves Manned Range 3 and East TAC. Luke AFB EOD controls all access into these areas. Some explosive demolition work is occasionally performed at these sites.

### **Other Military Ground Uses**

Military ground use in the BMGR-E outside of the above facilities is limited to roads and emergency situations. Sites used by the Ground Forward Air Controllers are accessible by roads/hiking. Use of the sites and use of Ground Forward Air Controllers is limited in scope and accounts for less than one percent of all missions on the BMGR.

### **Future use on the BMGR**

The Air Force is continually working to improve and modernize training opportunities on BMGR-E as required by their mission. At this time they report no significant changes in the formal planning process. If this changes, the Air Force will initiate consultation at the earliest stages possible in the planning effort. Projected use may increase the range utilization rate from 49 percent to approximately 60 percent. No changes in the area of land impacted by military activities are expected.

### **Conservation Measures**

The USAF has been funding and/or actively working on SOPH recovery projects since before 1983. Specifically the USAF has obligated over \$2.3 million dollars to support programs and research studies for SOPH. In addition to funding five biologists who monitor for the presence of SOPH on the BMGR, the AF has provided a full-time staff biologist to oversee the SOPH programs. The programs include radio collaring, aerial telemetry flights, assessing the effects of aircraft during the day and night missions; studies of SOPH diet, habitat use and genetics; tactical range monitoring before flights; forage enhancement; and a captive breeding project.

The USAF proposes to implement or continue implementation of the following conservation measures:

1. A revised EOD - TAC range maintenance schedule has been implemented to reduce potential effects to SOPH as follows: East TAC - 15 March to 15 May; North TAC - 1 January to 28 February; South TAC - 1 October to 15 December. These dates are subject to scheduling changes which may move the starting and ending dates by two weeks.

2. All BMGR-E users are briefed on the SOPH. The briefings cover the status of the species, the importance in reducing impacts to the species, and any mitigation measures the users must comply with while on the range.
3. All vehicles are restricted to designated roads except as required by EOD, Maintenance, emergency response, and Environmental Sciences personnel including authorized contractors while conducting required mission support activities.
4. When actions require new surface disturbance in current SOPH habitat, every effort will be made to minimize the extent of surface disturbance and to restore the area to the previous grade when such work is practicable. Most actions will be conducted on the existing road system but there will be a few cases where that cannot be done, such as during annual EOD clearances. The USAF will make every effort to minimize the impacts of operations to vegetation and friable soils and for operations to be consistent with the conservation measures and terms and conditions of the November 16, 2001 opinion.
5. Low speed limits on roadways will continue to be enforced to ensure that no SOPH are injured due to vehicles. 56 RMO Operating Instruction (O.I.) 1.1 specifies that vehicle speed limits for all ground personnel will be reduced when approaching known SOPH locations. O.I.1.1 speed limits on BMGR-E within SOPH habitat are 35 mph on major graded roads and 25 mph on all other roads.
6. Continue Air Force funding for an on-going study with Arizona Game and Fish Department (AGFD) to determine the effects of military night operations on SOPH. Because of the current low SOPH population a mule deer surrogate will be used for this study.
7. The USAF has started, but still has to complete, a study to determine the effects of military activities on SOPH during the fawning season. Because of the current low population numbers for SOPH in the U.S., this project will be limited to observations made by the Air Force biological monitors on the TACs.
8. The USAF will continue to coordinate and share data with the Service offices at Cabeza Prieta NWR and the Arizona ESFO on all SOPH studies and monitoring efforts.
9. The USAF will continue to revise "Operating Instruction 1.1, SOPH" from monitoring data collected by the SOPH monitors and input provided by the SOPH Recovery Team. Luke AFB will use the annual internal reviews of 56 RMO OI 1.1 to assess and adjust the guidelines to further the recovery of the SOPH.
10. In accordance with its responsibilities under the MLWA of 1999 and the Sikes Act, Luke AFB will continue to work with its agency partners- the Marine Corps, the Service, BLM,

and AGFD- to complete development of and to implement the proposed INRMP for the BMGR. The proposed INRMP, which incorporates ecosystem management principles, is designed to establish a long-term resource stewardship program for the BMGR that will provide for protection, conservation, and rehabilitation of natural resources, including SOPH and their habitat. The proposed INRMP will also provide for sustained public use of the range consistent with its military purposes and will undergo a review every five years. The proposed INRMP will fully support the requirements of the SOPH Recovery Plan and the actions of the SOPH Recovery Team. The Record of Decision for the INRMP is projected to be signed in the fall of 2003.

11. The AF produces an annual report, supplied to this office, that summarizes the results of all monitoring efforts (including the biological monitors annual report), the Range Use annual report, all range incidents, and a brief summary of all contract and construction work in SOPH current habitat will be provided to this office. The report includes the date and location of any SOPH observed by Air Force personnel and contractors, including observations of injured or dead SOPH. This report describes in detail how each of the conservation measures were implemented. Reports that may be produced in association with implementation of the conservation measures or this opinion will be appended to the annual monitoring report. The annual report will be submitted March of each year. Incidents of dead or injured SOPH will be reported within 24 hours to the Recovery Lead at Cabeza Prieta NWR and to this office.
12. Luke AFB has closed San Cristobal Valley to all recreation use; access is only allowed by permittees with a special use permit issued by 56 RMO. Special use permits for San Cristobal Valley are not issued during 15 March - 15 July to protect SOPH fawning period.
13. The AF has removed several kilometers of barbed wire fencing from SOPH habitat. Fencing is a known deterrent to SOPH foraging and movement and poses a potential tangle hazard. The AF has identified additional fencing for removal upon completion of documentation required by the National Environmental Policy Act. The AF will continue to remove unnecessary fencing as it is identified.
14. The AF has agreed to install two forage enhancement plots on BMGR-E. Funding will be required to maintain and operate those forage enhancement plots in the future for as long as they are needed. The AF proposes working with the SOPH Recovery Team to estimate operation costs for all forage enhancement plots and determine how to best cost-share that undertaking among the interested agencies.
15. The AF agreed to water selected roadsides in the summer of 2002 during the height of the SOPH decline. The AF will continue this effort under guidance from the SOPH Recovery Team as funding permits.

16. Luke AFB additionally proposes projects to be submitted to the SOPH Recovery Team to study the effects of undocumented migrants on SOPH, vegetation transects to be done in the TACs and BMGR as recommended in an earlier study, and a soil analysis to be done at HE Hill to try to determine the causes of enhanced annual plant growth in these areas.
17. As identified in the 56 RMO letter of August 8, 2001, the USAF will continue to assist in supporting research and active management to determine the limiting factors of this SOPH population through the prioritized recovery projects identified in the letter.

Luke AFB additionally proposes projects to be submitted to the SOPH Recovery Team to study the effects of undocumented migrants on SOPH, vegetation transects to be done in the TACs and BMGR as recommended in an earlier study, and a soil analysis to be done at HE Hill to try to determine the causes of annual plant growth rates in these areas.

## II. STATUS OF THE SPECIES

### A. Description, Legal Status, and Recovery Planning

The Sonoran subspecies of pronghorn (*Antilocapra americana sonoriensis*) was first described by Goldman (1945) from a type specimen taken near the Costa Rica Ranch, Sonora, Mexico by Vernon Bailey and Frederic Winthrop on December 11, 1932, and is currently recognized as one of five subspecies of pronghorn (Nowak and Paradiso 1983). Recent molecular genetic analysis of the SOPH and other subspecies of the American pronghorn did not provide a clear genetic basis for designation of the SOPH as a distinct subspecies (Rhodes *et al.* 2003). However, the analysis showed a clear genetic differentiation of the SOPH from pronghorn populations in central and eastern Arizona. The authors found that any evaluation of the taxonomy of the SOPH should not only evaluate genetic information, but should also rely on extensive morphological and ecological analysis; which to date have not been completed.

The SOPH is the physically smallest subspecies of *Antilocapra americana*. The subspecies was listed throughout its range as endangered on March 11, 1967 (32 FR 4001) under the Endangered Species Preservation Act of October 15, 1966. Three sub-populations of the SOPH are extant: 1) a U.S. sub-population in southwestern Arizona, 2) a sub-population in the Pinacate Region of northwestern Sonora, and 3) a sub-population on the Gulf of California west and north of Caborca, Sonora. The three sub-populations are geographically isolated due to barriers such as roads and fences, and in the case of the two Sonora sub-populations, by distance. Critical habitat has not been designated for the pronghorn.

The 1982 SOPH Recovery Plan (U.S. Fish and Wildlife Service 1982) was revised in 1998 (U.S. Fish and Wildlife Service 1998a). The recovery criteria presented in the revised plan entailed the establishment of a population of 300 adult pronghorn in one self-sustaining population for a minimum of five years, as well as the establishment of at least one other self-sustaining population in the U.S. to reclassify the subspecies to threatened.

Actions identified as necessary to achieve these goals include the following: 1) enhance present sub-populations of pronghorn by providing supplemental forage and/or water; 2) determine habitat needs and protect present range; 3) investigate and address potential barriers to expansion of presently used range and investigate, evaluate, and prioritize present and potential future reintroduction sites within historical range; 4) establish and monitor a new, separate herd(s) to guard against catastrophes decimating the core population, and investigate captive breeding; 5) continue monitoring sub-populations and maintain a protocol for a repeatable and comparable survey technique; and 6) examine additional specimen evidence available to assist in verification of taxonomic status.

In February 2001, the D.C. Federal District Court ordered the Fish and Wildlife Service to reassess SOPH recovery criteria and to provide estimates of time required to perform recovery actions detailed in the 1998 plan. In response, a supplement and amendment to the 1998 Final Revised SOPH Recovery Plan was prepared (U.S. Fish and Wildlife Service 2001). We concluded that, given the nature of the current threats, unknown elements of pronghorn life history and habitat requirements, uncertainty of availability of suitable reintroduction sites and animals for transplants, internal and external resistance to pro-active management actions on wilderness and other areas of public lands, and continuing uncertainty regarding the long-term stability and status of sub-populations in Mexico, the data do not yet exist to support establishing delisting criteria. Tasks necessary to accomplish reclassification to threatened status (as outlined in the 1998 plan) should provide the information necessary to determine if and when delisting will be possible and what the criteria should be.

## **B. Life History**

SOPH inhabit one of the hottest and driest portions of the Sonoran Desert. They forage on a large variety of perennial and annual plant species (Hughes and Smith 1990, Hervert *et al.* 1997b, U.S. Fish and Wildlife Service 1998a), and will move in response to spatial limitations in forage availability (Hervert *et al.* 1997a). Although it is theoretically possible for pronghorn to meet water requirements through forage consumption (Fox *et al.* 1997), after subtracting water required for excretion, respiration, and evaporation (approximately 50 percent), predicted water intake from forage was not adequate to meet minimum water requirements for 14 of 20 simulated diets (Fox *et al.* 2000). SOPH will drink surface water if it is available (U.S. Fish and Wildlife Service 1998a).

Pronghorn consume a wide variety of plants. Fecal analysis indicated SOPH consume 69 percent forbs, 22 percent shrubs, 7 percent cacti, and 0.4 percent grasses (U.S. Fish and Wildlife Service 1998a). During drought years, Hughes and Smith (1990) reported cacti were the major dietary component (44 percent). Consumption of cacti, especially chain fruit cholla (*Cylindropuntia fulgida*, Pinkava 1999), provides a source of water during hot, dry conditions (Hervert *et al.* 1997b). Other important plant species in the diet of the pronghorn include pigweed (*Amaranthus palmeri*), ragweed (*Ambrosia* sp.), locoweed (*Astragalus* sp.), brome (*Bromus* sp.), and snakeweed (*Gutierrezia sarothrae*) (U.S. Fish and Wildlife Service 1998a).

SOPH rut during July-September, and does with newborn fawns have been observed from February through May. Parturition corresponds with annual spring forage abundance. Fawning areas have been documented in the Mohawk Dunes and the bajadas of the Sierra Pinta, Mohawk, Bates, Growler, and Puerto Blanco mountains. Does usually have twins, and fawns suckle for about 2 months (Byers 1997). Does gather with fawns, and fawns sometimes form nursery groups (U.S. Fish and Wildlife Service 1998a). Hughes and Smith (1990) recorded an average group size of 2.5 animals; however, group size observed by Wright and deVos (1986) averaged 5.1, with the largest group containing 21 animals. Group size likely varies with population size. At that time the U.S. sub-population was roughly about 100 animals (Arizona Game and Fish Department 1981, 1986).

The results of telemetry studies in 1983-1991 indicated that SOPHs non-randomly use their habitats (deVos 1998). Pronghorn move from north to south or northwest to southeast, and upslope into chain fruit cholla areas as summer progresses. Movements are most likely motivated by the need for thermal cover provided by leguminous trees and water available in succulent cacti such as chain fruit cholla (Hervert *et al.* 1997b), that are more abundant on bajadas and in the southern portion of the pronghorn's range. Home range size of SOPH ranged from 24.9 to 468 m<sup>2</sup> for males and from 15.7 to 441 m<sup>2</sup> for females (Wright and deVos 1986).

Causes of pronghorn mortality are often difficult to determine; however, some radio-collared SOPH have been killed by coyotes, mountain lions, and bobcats (J. Morgart, Cabeza Prieta NWR, pers. comm. 2003). Some of these mortalities may have been influenced by dry periods, which predisposed pronghorn to predation (U.S. Fish and Wildlife Service 1998a). Hervert *et al.* (2000) found that the number of fawns surviving until the first summer rains was significantly correlated to the amount of preceding winter rainfall, and negatively correlated to the number of days without rain between the last winter rain and the first summer rain. Three radio-collared pronghorn died in July and August of 2002 with no obvious cause of death. Given that 2002 was one of the driest years on record, the proximate cause of these mortalities was likely heat stress and/or malnutrition resulting from inadequate forage conditions due to drought [(J. Hervert, Arizona Game and Fish Department, pers. comm. 2002)].

### **C. Habitat**

Turner and Brown (1982) described seven subdivisions of Sonoran Desert scrub, two of which encompass the habitat of SOPH in the U.S. and the Pinacate Region of Sonora (Felger 2000). These are the Lower Colorado River Valley and the Arizona Upland subdivisions. Creosote (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) are dominant perennials of the Lower Colorado River Valley subdivision. Plant species along major water courses include ironwood (*Olneya tesota*), blue palo verde (*Parkinsonia floridum*), and mesquite (*Prosopis velutina* and *P. glandulosa*). Species in the Arizona Upland include foothill palo verde (*Parkinsonia microphyllum*), catclaw acacia (*Acacia greggii*), chain fruit cholla, teddy bear cholla (*Cylindropuntia bigelovii*), buckhorn cholla (*C. acanthocarpa*), and staghorn cholla (*C. versicolor*).

The habitat of the pronghorn in the U.S. consists of broad alluvial valleys separated by block-faulted mountain and surface volcanics. In December 1984, 40 percent of the pronghorn observed during a telemetry flight were in the Growler Valley, from the Aguila Mountains to the International Border. Arizona Game and Fish Department (1985) reported that pronghorn use flat valleys and isolated hills to a greater degree than other topographic features.

Drainages and bajadas are used by pronghorn during spring and summer. Washes flow briefly after rains during the monsoon season and after sustained winter rains. The network created by these washes provides important thermal cover (shade) for pronghorn during the hot summer season. Bajadas are used as fawning areas in the spring. Pronghorn were observed using palo verde, ironwood, and mesquite for cover during weekly Arizona Game and Fish Department telemetry flights, which began in 1994 (Hervert *et al.* 1997b). Pronghorn were observed in playas in April and May of 1988 and 1989 when forbs were abundant, later vacating these areas when desiccation of annuals occurred (Hughes and Smith 1990). In years with sufficient winter and spring precipitation, some playas produce abundant annual plant growth as do some target areas on the BMGR.

Some of the sandy areas within pronghorn habitat such as Pinta Sands, the Mohawk Dunes west of the Mohawk Mountains, and the west side of the Aguila Mountains, provide a greater variety of seasonal vegetation when precipitation events occur. The openness of these areas appears to be attractive for pronghorn as the annuals, grasses, and shrubs provide good forage, particularly in the spring. These areas have long been considered significant pronghorn habitat in the U.S. Carr (1974) reported seeing pronghorn frequently in the Pinta Sands area. Due to the more arid nature of valley and dune habitats, annuals dry and cure, with decreased palatability for pronghorns as summer approaches. Also, these habitats lack sufficient woody vegetation to satisfy pronghorn requirements for nutrition and thermal protection. These factors limit the temporal suitability of these areas and most pronghorn move to bajadas and washes in the southeastern portion of the range by early summer.

#### **D. Distribution and Abundance**

##### *United States*

Prior to the identification of the subspecies known as the SOPH (Goldman 1945), specimens of pronghorn taken within its range were identified as other subspecies (Arizona Game and Fish Department 1981). Historically, the SOPH ranged in the U.S. from approximately the Santa Cruz River in the east, to the Gila Bend and Kofa Mountains to the north, and to Imperial Valley, California, to the west (Mearns 1907, Nelson 1925, Monson 1968, Wright and deVos 1986, Paradiso and Nowak 1971; Figure 2).

During an international boundary survey conducted from 1892 through 1894, pronghorn were found in every open valley along the international boundary from Nogales, Mexico to Yuma, Arizona (Carr 1971). In 1893, Mearns (1907) reported seeing a herd of 12 pronghorn near border monument 143 in the Baboquivari Valley and small numbers in the Santa Rosa Valley near monument 161 on what is now the Tohono O'odham Nation. Nelson (1925) stated that in 1923,

local people reported that a few pronghorn were still ranging in the Santa Rosa Valley. Carr (1970) noted the “sighting of eight antelope near Pisinimo on the “Papago Indian Reservation” (Tohono O’odham Nation) which most likely drifted north from Mexico,” and that “there have been numerous rumors of antelope in the Papago country”; however, no recent reliable observations are known. Carr (1970) also stated that there “is a considerable amount of good Sonoran antelope habitat on the Papago Indian Reservation and particularly in the Great Plains area. However, Indian hunting and grazing practices prohibit a lasting resident antelope population.” Fencing on rangelands probably also created barriers to pronghorn movement on the Reservation and elsewhere. In 1894, pronghorn were abundant near monuments 178 and 179, and westward to Tule Well (Mearns 1907). In February 1894, Mearns observed them in the Lechuguilla Desert, as well. In the Colorado Desert (presumably west of the Gila and Tinajas Altas mountains), Mearns (1907) reported that pronghorn were not abundant. He observed pronghorn tracks in California at Gardner’s Laguna, 6 miles south of monument 216, and 37 miles west of the Colorado River; and then again at Laguna Station, 7 miles north of monument 224 and 65 miles west of the Colorado River.

While Mearns (1907) suggested that pronghorn may have been common in some areas in the late 1800s, evidence suggests that the sub-population declined dramatically in the early 20<sup>th</sup> century. Sub-population estimates for Arizona, which only began in 1925, have never shown the pronghorn to be abundant (Table 1).

Repeatable, systematic surveys were not conducted in Arizona until 1992. Since 1992, SOPH in the United States have been surveyed biennially (Bright *et al.* 1999, 2001) using aerial line transects (Johnson *et al.* 1991). Sub-population estimates from these transects have been derived using three different estimators (Table 2); currently the sightability model (Samuel and Pollock 1981) is considered the most reliable estimator (Bright *et al.* 1999, 2001). Table 2 presents observation data from transects and compares estimates derived from the three population models from 1992 through 2002.

Bright *et al.* (2001) defined the present U.S. range of the SOPH as bordered by Interstate 8 to the north, the International Border to the south, the Copper and Cabeza mountains to the west, and SR 85 to the east (see Figures 1 and 3). This area encompasses 2,508 mi<sup>2</sup> (Bright *et al.* 2001). Based on pronghorn location records from 1994-2001 (Figure 3), locations of pronghorn from 1983-1995, and observations by Carr (1972) and Hall (1981), pronghorn are believed to have occurred most frequently in the recent past in the following areas: Pinta Sands, Growler Valley, Mohawk Valley, San Cristobal Valley, and between the Growler and Little Ajo Mountains (Daniel’s Arroyo area). Wright and deVos (1986) stated that observations in the Growler Valley were frequent and that the Mohawk Valley, San Cristobal Valley, and BMGR supported herds of 10 to 20 animals during most of the year. Also mentioned was a regularly observed herd of 7 to 10 pronghorn in the Cameron tank area on BLM lands near Ajo.

Occasional sightings of pronghorn are recorded outside of the range defined by telemetry locations in Figure 3. For instance, a possible pronghorn sighting occurred east of Aztec and north of Interstate 8 in 1990 (U.S. Fish and Wildlife Service 1998a). Two adult pronghorn were observed in 1990 (U.S. Fish and Wildlife Service 1998a) in the northern San Cristobal Valley

approximately 5 miles southeast of Mohawk Pass in the Mohawk Mountains. In 1987, a Border Patrol agent reported a pronghorn on the Tohono O'odham Nation; this sighting was not confirmed.

Although observations of pronghorn were common along and east of SR 85 many years ago, observations east of SR 85 in recent years have been very rare. The paucity of recent observations east of the highway indicates that this heavily-used road currently poses a barrier to eastward movement. On June 12, 1996, however, an adult doe pronghorn was observed running west off the right-of-way at the approach of a vehicle on the north end of the Crater Range (R. Barry, Luke AFB, pers. comm. 1996). There also exists an unconfirmed report of four SOPH attempting to cross SR 85 in August 1993 approximately one mile north of the Organ Pipe Cactus NM visitor center. A juvenile crossed the highway (two lanes) to the east, but with the approach of a vehicle, ran back across the road to rejoin a group of three pronghorn (T. Ramon, Organ Pipe Cactus NM, pers. comm. 1993). In July 2002, a radio-collared pronghorn crossed SR 85 and continued on to the base of the Ajo Mountains where it later died in August 2002. In September 2002, a second radio-collared pronghorn crossed SR 85. This animal spent most of its time in the vicinity of Ajo Mountain Scenic Loop road, just off the southwestern end of the Diablo Mountains. After 8 days, she crossed back to the west side of Highway 85, and moved to a locally green area in the Growler Valley west of the monument. These seemingly aberrant movement patterns were likely the result of nutritional stress brought on by the 2002 drought, discussed further below. On July 3, 2003, a pronghorn was again observed crossing SR- 85 just north of the Organ Pipe Cactus NM's Visitor Center.

In recent years, the Tohono O'odham Nation has not been accessible to state and Federal biologists to survey for SOPH. A Border Patrol agent reported a pronghorn on the Nation lands in 1987 (U.S. Fish and Wildlife Service 1998a), and although unconfirmed, this is the last report of SOPH on the Nation. There are no recent records of pronghorn south of the Nation in Sonora. Carr (1970) reported that hunting and grazing on the Nation was not compatible with maintaining a viable population of pronghorn. Phelps (1981) reported that pronghorn had not been observed on the Nation for 10 years. These observations suggest that pronghorn are likely extirpated from the Nation and adjacent areas.

The sightability model population estimates from 1992 to 2000 showed a 45 percent decrease in sub-population size (Table 2). The estimates indicate a steady decline in sub-population size, with the exception of the 1994 survey. The 1994 estimate may be somewhat inflated due to inconsistencies in survey timing (U.S. Fish and Wildlife Service 1998a, Bright *et al.* 2001). The 1994 survey occurred in March (whereas those of other years occurred in December) and therefore the number may be slightly inflated because of the sightability of pronghorn at this time of year (J. Morgart, FWS, pers. comm. 2001). Different population models may result in divergent estimates. Therefore, the inclusion of estimates obtained prior to 1992 in the analysis of population trends is not reasonable.

Some researchers believe that the number of pronghorn observed on transects is more statistically valid for the evaluation of population trends than estimates generated by population models (Johnson *et al.* 1991, Hervert *et al.* 1997a). For instance, the number of pronghorn observed on

transects decreased by 32 percent from 1992 to 2000 (Table 2). Contrary to the sightability model estimate, the number of pronghorn observed on transects showed a minor increase, while the total number of pronghorn sighted actually decreased in 1994 compared to the 1992 survey. Sightability model estimates declined from 282 in 1994 to 130 in 1996. High fawn mortality in 1995 and 1996 and the death of half (8 of 16) of the adult, radio-collared pronghorn during the 13 months preceding the December 1996 survey suggests that the decline was real. Five consecutive six-month seasons of below normal precipitation (summer 1994 through summer 1996) throughout most of the SOPH range, likely contributed, in part, to observed mortality (Bright *et al.* 2001, Hervert *et al.* 1997b).

Adult mortality has been high in recent years, with predator-related mortality being the most frequently identifiable proximate cause of death (one of the recovery actions identified by the recovery team is development of a narrowly-defined and rigidly controlled coyote removal plan). Thirty-five adult pronghorn have been radio collared by Arizona Game and Fish Department since 1994. Of these, 31 (88 percent) have since died. A total of 13 of these mortalities were attributed to predation, while the remaining died from unknown causes. Some of the 18 mortalities attributed to unknown causes were likely caused by predation (J. Hervert, pers. comm. 2002); however, unavoidable lag times between time of death and scene investigation caused evidence to be obscured. No evidence of predation of pronghorn was documented near water sources (Hervert *et al.* 2000). Capture myopathy (physiological condition of an animal, caused by fear, stress, and/or overexertion that sometimes manifests itself during or up to 14 days after capture; left untreated the effects can range from temporary debilitation to death) may have played a role in up to five of the mortalities in 1994 (Hervert *et al.* 2000). In the majority of documented mortalities, bone marrow condition was assessed. Only one specimen was determined to be in poor to fair condition, while all others were determined to be in good condition.

Mortality of radio-collared adults in 2002 was exceptionally high. At the start of the year, seven radio-collared SOPH were at large in the U.S. sub-population. By December 2002, all but one of these had died. For most, drought stress was considered to be the proximate cause. For those animals that may have succumbed to predation, it was suspected that drought stress was again a factor, by making the animal more vulnerable to predation, due to an emaciated physical condition and being forced into predator habitats by drought. Three of these 2002 mortalities were females of prime breeding age (5-7 years old) with no identifiable cause of death. Given their relatively young age, lack of any signs of disease or predation, and the timing of their deaths during one of the most severe drought years ever recorded, these animals probably died of heat stress and/or malnutrition resulting from inadequate forage conditions due to drought (J. Hervert, pers. comm. 2002). The deaths of these prime-age individuals is indicative of how severe conditions were in 2002. Three sightings last summer of pronghorn in various parts of their range verified their declining condition. In July 2002, adult pronghorn were observed on Organ Pipe Cactus NM, Cabeza Prieta NWR, and the North TAC of BMGR. In all three cases, observers described the pronghorn as emaciated, with ribs visible, and rough-coated (M. Coffeen, FWS, pers. com. 2002). In August 2000, two pronghorn were spotted on the BLM's Cameron allotment about 2-3 miles south of Ajo by a Border Patrol agent. The agent reported the animals appeared "skinny" but were not emaciated or staggering.

The 2002 drought was one of the driest on record. As an example, annual rainfall at the Organ Pipe Cactus NM visitor center was only 2.54 inches in 2002 (T. Tibbitts, Organ Pipe Cactus NM, pers. comm. 2002); *average* annual rainfall for the visitor center is 9.2 inches (Brown 1994). The extreme drought conditions profoundly affected adult pronghorn, resulting in the highest adult mortality rate documented thus far. Since 1995, adult mortality has averaged 22 percent a year. Yearly mortality rates have fluctuated around this mean in direct relationship with precipitation. In 1997 and 1999, years with relatively good rainfall, there was only 12 and 10 percent adult mortality, respectively. In contrast, during 1996, a relatively severe drought year, a 38 percent adult mortality was documented. The 2002 population survey conducted in November and December revealed the U.S. sub-population had declined to the lowest level ever recorded. A total of 18 pronghorn were observed, in three groups (8, 9, and 1). Applying these data to the Arizona Game and Fish Department sightability model results in a population estimate of 21 animals (18-33, 95 percent confidence interval), or a 79% decline from 2000. Also, very few fawns survived in 2002 to replace these dying adults. Because of the poor condition and low survivorship of animals during the rut in late summer and early fall, there was some concern that surviving pronghorn may not have bred. However, six fawns have been detected so far in 2003. Adult pronghorn appear to be in good condition thus far, and the winter rains produced a good crop of ephemeral forage (J. Morgart, pers. comm. 2003).

Although drought was likely the proximate cause of the dramatic decline of the U.S. sub-population in 2002, anthropogenic factors almost certainly contributed to or exacerbated the effects of the drought. Historically, pronghorn likely moved to wetted areas and foraged along the Rio Sonoyta, Sonora, and the Gila and probably Colorado rivers during drought. These areas are no longer accessible for the U.S. population due to fences, Interstate 8, Mexico Highway 2, and other barriers. The rate of decline in the U.S. sub-population from 2000-2002 (79 percent) was also much greater than that observed in either the sub-population southeast of Highway 8 (18 percent decline) or the El Pinacate sub-population (26 percent) during the same period (see discussion of Mexican sub-populations in the next section). At least for the El Pinacate sub-population, observations of forage availability in the El Pinacate area from 2000-2002 and proximity to the U.S. population suggest the El Pinacate sub-population experienced the same severe drought that occurred on the Arizona side (T. Tibbitts, J. Morgart, pers. comm. 2003). Yet that sub-population fared much better than its U.S. counterpart. The high level of human activities and disturbance on the U.S. side, particularly in regard to undocumented alien traffic, smugglers, and law enforcement response, as compared to what occurs in the El Pinacate area, is a likely contributing factor in the difference in rate of decline observed north and south of the border. We do not have data on differences in demographics, predation rates, or other factors between Mexican and U.S. populations that may have also contributed to differences in rates of decline from 2000-2002. See the section entitled "Drought" in the Environmental Baseline and "Cumulative Effects" for further discussion.

In 1996, a workshop was held in which a population viability analysis (PVA) was conducted for the U.S. sub-population of SOPH (Defenders of Wildlife 1998). A PVA is a structured, systematic, and comprehensive examination of the interacting factors that place a population or species at risk (Gilpin and Soulé 1986). For the SOPH PVA, these factors included impacts of inbreeding, fecundity, fawn survival, adult survival, impacts of catastrophes, harvest, carrying

capacity, and numbers and sex/age composition of the present population. Use of three models were discussed at the workshop, but the PVA was only completed with one of the models - Vortex (Hosack *et al.* 2002) - due limited funding. Based on the best estimates of demographic parameters at the time, the likelihood of extinction of SOPH was calculated as one percent in the next 25 years, 9 percent in the next 50 years, and 23 percent in the next 100 years. More severe threats include population fluctuation, periodic decimation during drought (especially of fawns), small present population size, limited habitat preventing expansion to a more secure population size, and expected future inbreeding depression. The authors concluded that "this population of the SOPH, the only one in the U.S., is at serious risk of extinction." The authors made these conclusions prior to the severe drought and decline in the species in 2002. On the other hand, Hosack *et al.* (2002) found that some management actions were possible that could improve the chances of population persistence significantly. Actions that would ameliorate the effects of drought or minimize mortality of pronghorn were of particular importance for improving population persistence.

Furthermore, the PVA suggested that the current pronghorn population is extremely sensitive to fawn mortality, with the likelihood of extinction increasing markedly when fawn mortality exceeds 70 percent. Thus, a 30 percent fawn crop (30 fawns/100 does) each year is necessary to ensure the continuance of the U.S. sub-population. This level of reproductive success has only been achieved in two of the last nine years. Fawn survival is correlated with precipitation (Hervert *et al.* 1997b). With above average precipitation in 1998, 33 fawns per 100 does were produced (Bright *et al.* 2001). In 2001, precipitation levels in the pronghorn range were the highest seen in many years. Pronghorn numbers increased from 99 in December 2000 to approximately 140 individuals in December 2001 (based on an estimated increase of 50 individuals by recruitment, minus an estimated adult mortality rate of 11 percent). However, as discussed above, during the severe drought in 2002, all the gains from the previous year were lost. Although an estimated 50 fawns were recruited into the sub-population in 2001, it appears few of these young and still-maturing animals survived the severe drought conditions of 2002. However, a dead pronghorn thought to be a 2001 fawn was discovered in 2002. The animal was obviously killed by a bobcat, but appeared to be in good condition, with lots of fat in the body cavity. The 2002 fawn crop was estimated to be from one to five (J. Morgart, pers. comm. 2002), consistent with trends of low fawn crops in low precipitation years.

The SOPH's previously poor status, coupled with dramatic declines in both recruitment and adult survival during 2002, have resulted in the serious imperilment of the U.S. sub-population. Actions taken by Federal and state agencies in the immediate future will determine whether the SOPH will continue to survive in the United States. We, in close cooperation with the Arizona Game and Fish Department, Department of Defense, and other partners are initiating a series of emergency projects, such as providing water and forage enhancement projects, as well as embarking on longer term recovery actions, including developing a semi-captive breeding facility, to increase the likelihood that the U.S. sub-population will persist (see *Emergency Recovery Actions* in the Environmental Baseline for additional information).

*Mexico*

Historically, SOPH ranged in Sonora from the Arizona border south to Hermosillo and Kino Bay, west to at least the Sierra del Rosario, and east to the area south of the Baboquivari Valley on the Tohono O'odham Nation (Nelson 1925, Carr 1974, Monson 1968). The distribution in Baja California Norte is less clear, but observations by Mearns (1907) indicate they occurred in the Colorado Desert west of the Colorado River, as well.

SOPH are currently extant in two sub-populations in Mexico, including: (1) west of Highway 8 near the Pinacate Lava flow; and (2) north and west of Caborca and southeast of Highway 8. In 2001, a park ranger at Pozo Nuevo, El Pinacate y Gran Desierto de Altar Biosphere Reserve (El Pinacate), reported that pronghorn have been seen in recent years west of Volcan Pinacate to the Pozo Nuevo area, and reportedly use a cement cattle trough north of Pozo Nuevo (J. Rorabaugh, pers. comm. 2001).

Sub-populations of SOPH in Mexico had not been exhaustively surveyed until all suitable habitat within the current known range of the SOPH in Mexico was surveyed in December 2000 (Bright *et al.* 2001). Although the 1993 estimate was approximate, survey results suggested a decline in the sub-populations of 16 percent from 1993 to 2000 (Table 3). The December 2000 estimate was 346 individuals. This estimate, together with the 2001 U.S. estimate, provided a total estimated size of the U.S. and Mexico SOPH sub-populations in 2000-2001 of approximately 445 individuals (J.L. Bright *et al.*, Arizona Game and Fish Department, unpubl. data). Although the SOPH sub-populations in Mexico declined approximately 16 percent from 1993 to 2000, the decrease was not experienced equally across pronghorn range. SOPH habitat in Mexico is bisected by Highway 8. The sub-population southeast of Highway 8 remained stable or even increased slightly between 1993 and 2000 (Table 3). Forage conditions in 2000 were notably better in this area than the rest of SOPH range in Mexico and the U.S. (J. L. Bright *et al.*, Arizona Game and Fish Department, unpubl. data). The sub-population west of Highway 8 ranges throughout suitable habitat on and surrounding Volcan Pinacate, and is adjacent to the U.S. sub-population. Mexico Highway 2 (and to a lesser extent the international boundary fence) acts as a barrier to movement between El Pinacate and U.S. sub-populations. The El Pinacate sub-population declined by approximately 73 percent between 1993 and 2000 (Table 3). Dry periods and associated poor forage conditions, likely exacerbated by extensive livestock grazing, may have figured prominently in the significant decline observed in the El Pinacate sub-population. Pronghorn moving across Highway 8 to the southeast may also be an explanation for the changes in these sub-populations' sizes. Between 1993 and 2001, Highway 8 was widened and improved, increasing traffic and probably increasing its effectiveness as a barrier to pronghorn movement.

The two Mexico sub-populations were resurveyed in December 2002. A grand total (both El Pinacate and southeast of Highway 8) of 214 pronghorn in 32 groups were seen for a tentative population estimate of 280. (Note this may underestimate the sub-population due to animals that apparently moved between survey blocks between counts.) This represented a decline from the total number seen (266 - decline of 20 percent) and estimated (346 - decline of 19 percent) in December 2000. A total of 19 pronghorn were observed in the El Pinacate area for an estimate of 25. This is down from 34 estimated in 2000 (decline of 26 percent). In regard to the sub-

population southeast of Highway 8, 195 pronghorn were observed, which extrapolates to an estimate of 255. This is also down somewhat from the 2000 estimate when 249 were observed, with an estimate of 311 (decline of 18 percent). Based on the 2002 surveys, the total number of pronghorn in the U.S. and Mexico is estimated at 301, a decline of 32 percent from 2000 (Bright *et al.* unpubl. data).

## **E. Threats**

### *Barriers that Limit Distribution and Movement*

SOPH require vast areas of unencumbered open range to meet their annual needs for survival and reproduction. This includes the ability to freely travel long distances between localized, seasonally sporadic rainfall events in search of forage. Highways, fences, railroads, developed areas, and irrigation canals can block these essential movements. Highway 2 in Mexico runs parallel to the southern boundary of Cabeza Prieta NWR and divides the range of the pronghorn between the U.S. and El Pinacate sub-populations. This highway supports a considerable amount of fast-moving vehicular traffic, and is fenced along its length, so is likely a substantial barrier to SOPH. In 1999, Dr. Rodrigo Medellin of Instituto de Ecologia reported that Sonora, Mexico is planning to widen and improve Highway 2 to four lanes, which would further reduce the likelihood of pronghorn crossing the highway.

Both Cabeza Prieta NWR and Organ Pipe Cactus NM maintain boundary fences along the border. At the southern boundary of Cabeza Prieta NWR, a seven-strand livestock fence has been a substantial barrier to pronghorn; however, some large gaps now exist in the fence, apparently as a result of theft of the fence posts and wire. The fence is periodically repaired. Modifying the fences along the U.S./Mexico border to allow pronghorn passage could aid in maintaining genetic diversity if sufficient pronghorn movement occurred. It may, however, also lead to increased pronghorn fatalities from motorized traffic on Highway 2. Mexico has been involved in discussions regarding the fences, as any modifications could potentially affect pronghorn sub-populations in both countries. SOPH habitat in Mexico is also bisected by Highway 8 between Sonoyta and Puerto Peñasco. This highway is bordered in part by a livestock fence and receives considerable tourist traffic. A less-traveled highway runs from Puerto Peñasco to Caborca.

Between Gila Bend and Lukeville, Arizona, SR 85 appears to be a significant barrier to pronghorn dispersal eastward from their current range. Traffic volume and average speeds have increased substantially over the last 30 years as international trade and tourism have increased. The Arizona Department of Transportation increased the posted speed limit on SR 85 from 55 to 65 miles per hour (mph) in 1997, and 85<sup>th</sup> percentile traffic speed has increased from 68-71 mph in the same period (Organ Pipe Cactus NM 2001). This highway corridor is unfenced in Organ Pipe Cactus NM, allowing potential free movement of pronghorn and other wildlife, but has livestock fencing on both sides for most of the remaining mileage on BLM, DoD, and private lands between Interstate 8 and Organ Pipe Cactus NM. Interstate 8, the Wellton-Mohawk Canal, agriculture, a railroad, and associated fences and human disturbance near the Gila River act as barriers for northward movement of pronghorn. De-watering of reaches of the Sonoyta River and

some portions of the lower Gila River, and barriers to pronghorn accessing the Gila River, such as Interstate 8 and the Wellton-Mohawk Canal, have caused significant loss of habitat and loss of access to water (Wright and deVos 1986). Agricultural, urban, and commercial development at Sonoyta, Puerto Peñasco, and San Luis, Sonora; in the Mexicali Valley, Baja California Norte; and at Ajo, Yuma, and along the Gila River, Arizona, have removed habitat and created barriers to movement. BLM grazing allotment fences in the Ajo area have been modified to allow safe passage of pronghorn. Although fences can be designed to encourage safe passage, pronghorn are less likely to move across any fence line, regardless of design, than through an area without fences (J. Morgart, pers. comm. 2002). The BLM proposes to lay down the fences on portions of the Cameron allotment during the summer, this proposal is scheduled to be implemented during fiscal years 2004-2006.

Historically, pronghorn occurred in the Lechuguilla Desert and in low numbers in the Colorado Desert to the west of the Gila and Tinajas Altas mountains (Mearns 1907). No apparent barrier to movement from their current range to the Lechuguilla Desert exists. Interstate 8, Mexico Highway 2, and the Gila and Tinajas Altas mountains form a substantial barrier to movement between the Lechuguilla Desert and the Yuma Desert; however, pronghorn could potentially use Tinajas Altas pass as a corridor through the mountains.

#### *Human-caused Disturbance*

A variety of human activities occur throughout the range of the pronghorn that have the potential to disturb pronghorn or its habitat, including livestock grazing in the U.S. and Mexico; military activities; recreation; biological monitoring and recovery actions; poaching and hunting; clearing of desert scrub and planting of buffleggrass in Sonora; dewatering and development along the Gila River and Rio Sonoyta; increasing undocumented immigration and drug trafficking across the international border and associated law enforcement response; and roads, fences, canals, and other artificial barriers.

Studies of captive pronghorn, other than the Sonoran subspecies, have shown that they are sensitive to disturbance such as human presence and vehicular noise. Human traffic, such as a person walking or running past pronghorn in an enclosed pen, a motorcycle driving past, a truck driving past, a truck blowing its horn while driving past, or a person entering a holding pen, caused an increased heart-rate response in American pronghorn in half-acre holding pens (Workman *et al.* 1992). The highest heart rates occurred in female pronghorn in response to a person entering a holding pen, or a truck driving past while sounding the horn. The lowest heart rates occurred when a motorcycle or truck was driven past their pen. Pronghorn were more sensitive to helicopters, particularly those flying at low levels or hovering, than fixed wing aircraft. Other investigators have shown that heart rate increases in response to auditory or visual disturbance in the absence of overt behavioral changes (Thompson *et al.* 1968, Cherkovich and Tatoyan 1973, Moen *et al.* 1978).

A pronghorn can canter effortlessly at 25 mph, gallop without straining at 44 mph, and run flat out at speeds of 55-62 mph (Byers 1997). During an aerial reconnaissance, one herd of SOPH was observed 12 miles away from the initial observation location 1.5 hours later (Wright and

deVos 1986). Hughes and Smith (1990) found that pronghorn immediately ran 1,310-1,650 feet from a vehicle, and that military low-level flights (<500 feet AGL) over three pronghorn caused them to move about 330 feet from their original location. Krausman *et al.* (2001) examined effects of military aircraft and ground-based activities on SOPH at the North and South TACs and concluded that behavioral patterns were similar with and without presence of military stimuli. Military activities, both ground-based and aerial, were associated with some changes in behavior (e.g., from standing to trotting or running, or bedded to standing) but the authors concluded that these changes were not likely to be detrimental to the animals. Eighty-seven (4.1 percent) of the 2,128 events with ground-based stimuli resulted in pronghorn changing their behavior to trotting or running; a total of 866 (41 percent) resulted in some change in behavior. Krausman *et al.* (2001) documented 149 direct overflights and 263 other overflights (in which the aircraft passed  $\geq 328$  feet to the side of the animal). Pronghorn changed their behavior 39 and 35 percent of the time during direct and other overflights, respectively. Krausman *et al.* (2001) did not address the pronghorn's response to low-level helicopter flights. A study is being developed to quantify effects of helicopter flights by the Border Patrol on SOPH (J. deVos, Arizona Game and Fish Department, pers. comm. 2002). No conclusions could be drawn about effects to fawns due to poor fawn productivity during the Krausman *et al.* study. During times of drought, disturbances that cause pronghorns to startle and run would energetically have a more significant effect. Such energetic expenditures, particularly during times of stress, may lead to lower reproductive output and/or survival of individual animals (Geist 1971).

### *Habitat Disturbance*

Livestock grazing has the potential to significantly alter pronghorn habitat and behavior (Leftwich and Simpson 1978, Kindschy *et al.* 1982, Yoakum *et al.* 1996). This is especially true in the arid Sonoran Desert. Cattle and other domestic livestock were first brought to northwestern Sonora, Mexico, in 1694 (Wildeman and Brock 2000). Overgrazing well into the 19<sup>th</sup> century by Spaniards and their descendants caused widespread habitat changes throughout much of the Sonoran Desert, particularly in more settled areas such as central Sonora, Mexico (Sheridan 2000).

American ranchers were running livestock by the early 1900s in much of the area that would later become Organ Pipe Cactus NM (Rutman 1997) and Cabeza Prieta NWR (Cabeza Prieta NWR files). Because there was no international boundary fence until 1947, livestock from both the U.S. and Mexico ranged freely across the border (Rutman 1997). Rutman (1997) estimates 1,000 head of burros and horses were present in 1942 on the southern half of Organ Pipe Cactus NM, and as many as 3,000 cattle were present on Organ Pipe Cactus NM at one time. Cattle were removed from Organ Pipe Cactus NM, Cabeza Prieta NWR, and the BMGR in 1979, 1983, and 1986, respectively (U.S. Fish and Wildlife Service 1998a, Rutman 1997). Grazing continues to be an important use of currently used pronghorn habitat on BLM lands south of Ajo, former pronghorn habitat on the Tohono O'odham Nation and the Altar Valley, and in current and former habitats in Sonora. Wright and deVos (1986) stated that poor habitat conditions (caused in part by livestock grazing) still appeared to be the leading cause in the decline in SOPH numbers. In Sonora, livestock grazing occurs in ejidos (community ranches or farms) and other ranch lands throughout much of the range of the pronghorn. Cattle range farther in years with

abundant annual growth and are more limited to areas near water during hot and dry periods and seasons.

Mining occurred historically throughout much of the U.S. range of the pronghorn. Miners probably hunted pronghorn and disturbed habitat locally. Mining is currently not a significant threat to SOPH in the U.S. No mining occurs now on the BMGR or Organ Pipe Cactus NM. Cabeza Prieta NWR has one active mining claim. The open pit and associated tailings piles at the Phelps Dodge copper mine at Ajo eliminated habitat in that area (MCAS-Yuma 2001, Organ Pipe Cactus NM 2001), but the mine is no longer in operation. During pronghorn surveys in Mexico in 2002, increasing effects from mining activities were noted in habitats used by the sub-population located southeast of Highway 8.

Illegal crossings by undocumented immigrants and drug smugglers in the U.S. range of the pronghorn have increased dramatically in recent years. Deportable migrant apprehensions by Border Patrol agents in the Ajo Station increased steadily from 9,150 in 1996 to 20,340 in 2000 (U.S. Immigration and Naturalization Service 2001). In 2001, estimates of undocumented migrants traffic reached 1,000 per night in Organ Pipe Cactus NM alone (Organ Pipe Cactus NM 2001) and an estimated 150,000 people entered the monument illegally from Mexico (Milstead and Barns 2002). Illegal border-related activities and Border Patrol response have resulted in widespread habitat degradation and increased human presence in remote areas. Increased presence of Border Patrol in the Douglas, Arizona area, and in San Diego (Operation Gatekeeper) and southeastern California, have pushed undocumented migrant traffic into remote desert areas, such as Cabeza Prieta NWR, Organ Pipe Cactus NM, and the BMGR (Klein 2000).

#### *Small Population Size and Random Changes in Demographics*

A possible minimum viable population for pronghorn is 50 animals (Reed *et al.* 1986, Scott 1990). At populations of less than 100, population viability declines at an increasingly steep rate. To maintain genetic diversity over the long term, a population of at least 500 is desirable (Defenders of Wildlife 1998). The U.S. sub-population is now estimated at 21 after the 2002 drought. At an estimated 25 in 2002 the El Pinacate sub-population is also well below the possible minimum viable population. Thus, 2 of the 3 pronghorn sub-populations are seriously endangered. At 280 animals, the third sub-population (southeast of Highway 8) may be too small to maintain genetic diversity. Loss of the U.S. sub-population would dramatically reduce our ability to manage or recover this subspecies. Populations at low levels may experience random variations in sex ratios, age distributions, and birth and death rates among individuals, which can cause fluctuations in population size and possibly extinction (Richter-Dyn and Goel 1972). The sex ratio as of December 2002 was skewed in favor of females (male:female ratio of 6:15, J. Morgart, pers. comm. 2003]), which may be advantageous in regard to reproductive potential. However, the small number of males may mean that some females may not encounter and breed with a male. In the future, a scenario in which males outnumber females by a similar margin is just as likely. In very sparse populations, males may have trouble finding females, reducing productivity (Ehrlich and Roughgarden 1987). Small populations are also sensitive to variations in natural processes, such as drought and predation (Hecht and Nickerson 1999).

In the 2001 consultation, we noted that the U.S. subpopulation, even assuming significant recruitment for that year, was well below 500 and dangerously close to 50. Of additional concern was the age of individual pronghorns in the U.S. subpopulation. Because of limited recruitment over the previous eight years, approximately 56 percent of the U.S. subpopulation was more than six years of age. Pronghorn rarely live more than 9 years in Sonoran desert habitats (Bright *et al.* 2001), thus we expect the majority of the current population to die in the next two to three years. However, the few pronghorn that survived severe conditions in 2002 are likely younger animals (J. Hervert, pers. comm. 2003).

### *Disease*

SOPH can potentially be infected by at least one bacterial (leptospirosis) and two viral (bluetongue and epizootic hemorrhagic disease) diseases. Bluetongue virus and epizootic hemorrhagic disease virus together produce a hemorrhagic disease syndrome. Pronghorn are susceptible to an additional two bacterial (Arcanobacterium and Fusobacterium) and four viral (parainfluenza, St. Louis encephalitis, vesicular stomatitis, and malignant catarrhal fever) diseases. Blood testing has shown pronghorn exposure to these diseases by increases in antibody titers over time. A number of other viral diseases, in particular, are known to affect North American ungulates and antelope and gazelle worldwide, including but not limited to, infectious bovine rhinotracheitis, bovine viral diarrhea and bovine syncytial virus (Williams and Barker 2001). The specific names, etiologies, signs, symptoms, reservoirs/hosts/transmission modes, controls, and applicable literature for those diseases specific to pronghorn are noted in Table 4.

Animals in general are subject to increased disease susceptibility when either very young, very old and debilitated, and/or stressed. The manner in which a particular disease is spread can also be a factor in disease risk. Noting Table 4, the diseases relevant to pronghorn can be transmitted indirectly through vectors, such as infected midges or ticks, or directly via aerosolized or direct contact of infected fluids or tissues. All the diseases in Table 4 are serious diseases of cattle, as well, and often lead to mortality. Cattle within the current range of the pronghorn have not been tested for the diseases listed in Table 4.

The most serious of the diseases listed in Table 4 are the two viruses, bluetongue virus (BTV) and epizootic hemorrhagic disease virus (EHDV), which together produce hemorrhagic disease (HD) syndrome. HD, in particular, can be spread by infected cattle via fecal contamination. Bovine feces are moist and voluminous, and at watering sources where animals congregate in large numbers, this fecal material is trampled into the soil, causing a substrate and odor that attract insects that are vectors capable of spreading the HD viruses from one animal to another nearby. Pronghorn, deer, and other wild ungulates produce drier, less voluminous, pelleted feces, which are less likely to produce moisture or odors that attract vectors, such as flies or midges.

Overcrowding at essential congregating areas, such as watering sources, particularly in times of drought is another factor that sets up an optimal situation for such disease transmission. Animals are competing for scarce resources and, particularly in times of severe drought, are stressed and debilitated.

Control of diseases in general can be managed in many cases by following often-used animal husbandry practices, including: 1) keeping hosts prone to infection (such as pronghorn and cattle) separated; 2) keeping vectors under control by ensuring that moist fecal material build-up at crucial areas (such as watering sources), does not occur; and, 3) keeping overcrowding, overconcentration, stressful competition and direct contact among animals to a minimum.

### **III. ENVIRONMENTAL BASELINE**

The environmental baseline includes past and present impacts of all Federal, state, or private actions in the action area; the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation; and the impact of state and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform from which to assess the effects of the action now under consultation.

#### **Sonoran Pronghorn**

##### **A. Action Area**

The “action area” means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. Within the U.S. portion of the SOPH’s range, pronghorn interact to form one sub-population in which interbreeding may occur. The U.S. sub-population is effectively separated from sub-populations in the El Pinacate Region and on the Gulf Coast of Sonora by Mexico Highways 2 and 8, and the U.S.-Mexico boundary fence. Activities that may affect animals in any portion of the U.S. range of the pronghorn may affect the size or structure of the U.S. sub-population, or habitat use within the U.S. range. The action area for this biological opinion is defined as the current range of the pronghorn within the U.S. (Figure 3), plus areas of BMGR-West (from the Copper and Cabeza Prieta mountains west to the western boundary of the BMGR in the Yuma Desert) and BMGR-East (East TAC and aircraft routes to East TAC) not currently occupied by pronghorn but in which Air Force activities are proposed. Although this entire area is affected, at least indirectly, by the proposed action, potential effects of the proposed action are likely to occur where Air Force activities occur, which is primarily in BMGR-East, but also at the TACs, Manned Ranges, Aux-11, and flight corridors across BMGR-East and Cabeza Prieta NWR (Figure 1).

Management of the action area is almost entirely by Federal agencies. As discussed above, the BMGR (roughly 1.6 million acres) is managed by Luke Air Force Base and MCAS-Yuma primarily for military training. Organ Pipe Cactus NM manages 329,000 acres in the southeastern corner of the action area for scenic, ecological, natural, and cultural values. Cabeza Prieta NWR lies along the border west of Organ Pipe Cactus NM and encompasses 860,000 acres. Cabeza Prieta NWR is managed to protect, maintain, and restore the diversity of the Sonoran Desert. Most of the refuge and Organ Pipe Cactus NM are designated as wilderness. The BLM manages lands near Ajo for recreation, grazing (four livestock grazing allotments totaling 191,740 acres, and one allotment totaling 21,876 acres), and other multiple uses in accordance with the Lower Gila Resource Management Plan.



## **B. Terrain, Vegetation Communities, and Climate in the Action Area**

The action area is characterized by broad alluvial valleys separated by block-faulted mountains and surface volcanics. The Yuma Desert on the western edge of the BMGR is part of a broad valley that includes the Colorado River. It is bordered on the east by the Gila and Tinajas Altas mountains. To the east of these mountains are a series of basins and ranges; from west to east these include the Lechuguilla Desert; the Cabeza Prieta and Copper Mountains; the Tule Desert and Mohawk Valley, including the Mohawk Dunes and Pinta Sand Dunes; the Sierra Pinta, Mohawk, and Bryan mountains; the San Cristobal Valley; the Aguila and Granite mountains; the Growler Valley; the Crater Range, Growler, Bates, and Agua Dulce mountains; and the La Abra Plain, and Puerto Blanco Mountains west of SR 85; Saucedo Mountains, Saucedo Valley, and Sand Tank Mountains east of SR-85, eastward to the base of the Ajo Mountains. Elevations range from 180 feet in the southwestern corner of the BMGR to 3,294 feet in the Growler Mountains. Major drainages and mountain ranges run northwest to southeast. The mountains are of two major types: a sierra type, composed of metamorphic and granitic rock, and a mesa type, typically of basaltic composition. Major drainages flow mostly northward to the Gila River, although southern portions of Organ Pipe Cactus NM and the southern slope of the Agua Dulce Mountains drain south to the Rio Sonoyta, Sonora.

Climate is characterized by extreme aridity, mild winters, and hot summers. Approximately 2.7 inches of precipitation fall annually at Yuma, with slightly more than half of this occurring in the winter months (Brown 1994). Annual precipitation increases from west to east across the BMGR; at Aguajita/Quitobaquito, precipitation is 10.5 inches annually. Infrequent chubascos (tropical storms) bring heavy rains in September or October that can produce spectacular growth on warm-season perennial plants (Felger 2000).

The vegetation community of the western portion of the BMGR has been classified as the lower Colorado River Valley subdivision of Sonoran Desert scrub (Brown 1994). It is the largest and most arid subdivision of Sonoran Desert scrub. Vegetation in the valleys, particularly in the Yuma Desert, is dominated by the creosote-white bursage series of Sonoran Desert scrub (Brown 1994). This series occupies approximately three-fourths of the lowland or valley areas in the BMGR (Reichenbacher and Duncan 1989). In this series, creosote and white bursage are often co-dominants, with galleta grass (*Pleuraphis rigida*), dalea (*Psoralea emoryi*), coldenia (*Tequilia plicata*) and other locally abundant species. Distinctive floras are also found in dunes in the area, particularly in the Yuma Dunes west of the Tinajas Altas Mountains, at Pinta Sands, and at the Mohawk Dunes. Species such as dune buckwheat (*Eriogonum deserticola*), Mormon tea (*Ephedra trifurca*), bugseed (*Dicoria canescens*), dune spurge (*Euphorbia platysperma*), possibly the threatened Peirson's milkvetch (*Astragalus magdalenae peirsonii*), and wire lettuce (*Stephanomeria schottii*) are found in one or more of these dune habitats. These species are dune specialists typical of the Gran Desierto dunes in northwestern Sonora (Felger 2000).

In drainages, bajadas, and montane habitats (including the Mohawk, Cabeza Prieta, Granite, and the Sierra Pinta mountains), the mixed scrub series of the lower Colorado River subdivision (Brown 1994) is found. This community is more diverse than the creosote-bursage series and includes species more representative of the Arizona Upland subdivision of Sonoran Desert scrub,

such as palo verde, saguaro (*Carnegiea gigantea*), ironwood, and desert lavender (*Hyptis emoryi*), among others. Frost-sensitive species such as elephant tree (*Bursera microphylla*), limber bush (*Jatropha cuneata*), and Mexican jumping bean (*Sebastiania biloculare*) are also found in this community, but are more representative of species and genera of the Central Gulf Coast subdivision of Sonoran Desert scrub found to the south in Sonora (Dames and Moore 1995, Brown 1994).

The Arizona Upland subdivision of Sonoran Desert scrub is found in the Growler, Puerto Blanco, Ajo and Bates mountains, and surrounding bajadas. Vegetation in this community takes on the appearance of a scrubland or low woodland of leguminous trees, shrubs, and cacti. The woodland component is most developed and species richness is greatest in drainages. In the action area, common trees of the Arizona Upland include palo verdes, ironwood, catclaw acacia, and velvet mesquite (*Prosopis velutina*). Dominant cacti include saguaro, chain fruit cholla, teddy bear cholla, and organ pipe cactus. Senita cactus (*Lophocereus schottii*), more common to the south in Mexico, is found in the southern portion of Organ Pipe Cactus NM and the Agua Dulce Mountains, Cabeza Prieta NWR. Vegetation on Cabeza Prieta NWR, Organ Pipe Cactus NM, and most of the BMGR is relatively undisturbed by human activities, although the increasing numbers of immigrants and smugglers, and law enforcement response, across these areas are resulting in elevated resource damage.

### **C. Status of the Sonoran Pronghorn in the Action Area**

#### *Distribution*

Figure 3 illustrates records of SOPH in Arizona from 1994-2001. Additional locations are available, but they are few in number due to the loss of all telemetered pronghorn by July 2002 (all observations since then have been incidental) and the U.S. sub-population is at its lowest level ever recorded. Based on these locations and observed locations of pronghorn from 1983-1993, pronghorn have occurred most frequently in the following areas: Pinta Sands, Growler Valley, Mohawk Valley, San Cristobal Valley, and between the Growler and Little Ajo mountains (Daniel's Arroyo area). All localities from 1994-2001 are south of Interstate 8, east of the Copper and Cabeza Prieta mountains, and west of SR 85 (Bright *et al.* 2001). Pronghorn historically crossed SR 85 to use bajada habitats in eastern portions of Organ Pipe Cactus NM, and may still attempt to do so as indicated by the presence of the two radio-collared pronghorn which moved into areas east of SR 85 during summer 2002, and an animal that crossed SR 85 in July 2003. Habitat north of Interstate 8 has not been surveyed to any extent for pronghorn, but habitat in the vicinity of the Gila River is highly fragmented by agricultural and commercial development. Interstate 8 and the Wellton-Mohawk Canal are probably barriers to movement of pronghorn. The current range of the U.S. population of the SOPH encompasses 1,764,568 acres, of which 1,579,588 acres are suitable habitat (excluded are mountainous areas with the current range). Of the suitable habitat, 14 percent is located in BMGR-West, 28 percent in BMGR-East and 39, 12, four, one, and one percent are owned/managed by Cabeza Prieta NWR, Organ Pipe Cactus NM, BLM, Arizona State Land Department, and private individuals, respectively (MCAS-Yuma 2003).

On Cabeza Prieta NWR, pronghorn groups were most often observed on the southwestern edge of the Sierra Pinta Mountains and in the Pinta Sands, in the valley between the Sierra Pinta and Bryan mountains, the Antelope Hills between the Bryan and Agua Dulce mountains, the San Cristobal and Growler valleys, and near Daniel's Arroyo. At Organ Pipe Cactus NM, pronghorn were most often observed near Acuna and Bates wells, and west of the Bates Mountains and Cipriano Hills. On the BMGR, concentrations of animals were observed near HE Hill on South TAC, with scattered sightings through the San Cristobal Valley and into the Mohawk Valley. John Hervert (Arizona Game and Fish Department, pers. comm. 1996) has numerous locations of pronghorn in the northern portion of the Agua Dulce Mountains near Antelope Tank. Pronghorn may have used the Pinta Sands area to a greater degree in the early 1970s (Arizona Game and Fish Department 1981).

Pronghorn often seek the thermal cover found in the Arizona Upland subdivision of Sonoran Desert scrub during the hot, dry summer months. This cover is best developed in the southeastern portion of their range in Arizona. With the onset of summer rains or cooler temperatures, pronghorn may move to the more open valleys and flats, such as the Growler Valley and Pinta Sands. Rocky, mountainous terrain, such as the slopes of the Growler or Mohawk mountains, is not considered habitat for the SOPH (deVos 1990); however, pronghorn may be found on lower slopes and in associated washes (L. Thompson-Olais, FWS, pers. comm. 1996).

### *Drought*

Rowlands (2000) examined trends in precipitation for southwestern Arizona and Organ Pipe Cactus NM from 1895-1999. For southwestern Arizona, no trend in precipitation was found for the period, but low precipitation occurred around 1895 and during the 1950s. Periods of high precipitation occurred in 1915-1920 and in the 1980s. For Organ Pipe Cactus NM, there was a slightly increasing trend in monthly and annual precipitation over the period 1895-1999, a strong drought occurred in the 1950s, and a lesser drought occurred in the 1970s (e.g. Felger [1980] notes a 34-month period, from September 1969-August 1972, without precipitation in the Sierra del Rosario, Sonora). No discernable trend in precipitation in southwestern Arizona or Organ Pipe Cactus NM was found in the 1990s, which is when the current decline in the U.S. pronghorn population began. At four stations in southwestern Arizona, Hervert *et al.* (2000) note below normal precipitation in the winters of 1995/1996 (-2.78 inches) and 1996/1997 (-2.87 inches), and wet winters in 1994/1995 (+1.97 inches) and 1997/1998 (+4.29 inches). Annual plant production was exceptional in the winter of 1997/1998 and spring of 1998. The winter of 1992/1993 and spring of 1993 also saw a very good crop of annual plants. Because of increased precipitation, the eastern portions of the pronghorn's current range, including Organ Pipe Cactus NM, are most likely to support annual plant production, and thus are disproportionately important to the pronghorn.

Organ Pipe Cactus NM (2001) examined available data on precipitation and concluded that "although substantial year-to-year variations exist, the general trend in the later 20<sup>th</sup> century has been one of slightly increasing rainfall" at Organ Pipe Cactus NM. Since Rowland's analysis, we have had one year characterized by above-average rainfall and abundant ephemeral forage (2001)

and a year with virtually no precipitation or ephemeral forage (2002). Consistent with the findings of Hervert *et al.* (2000) and Bright *et al.* (2001), reproduction and survival were high in 2001 and very low in 2002. Historically, pronghorn populations must have weathered many severe droughts in the Sonoran Desert, including many that were more severe and longer term than what occurred in 2002. Given that pronghorn populations survived the droughts of the 1890s, 1950s, 1970s, and others before those it is unreasonable to solely attribute recent declines in the U.S. pronghorn population to drought. Organ Pipe Cactus NM (2001) concluded, "If (individual) recent dry years have had an impact on SOPH, it is most likely because in recent decades SOPH have much more limited options for coping with even brief moderate drought. Because of restrictions on their movements and range, and increasing human presence within their range, pronghorn are less able to employ their nomadic strategy in search of relief. It is not that drought itself is an impact, but possibly that drought has *become* an impact, due to other factors confounding the species' normal ecological strategy."

### *Emergency Recovery Actions*

A number of critically important emergency recovery projects have been recently initiated in an attempt to reverse the decline of the U.S. sub-population of the SOPH. These projects are designed to increase availability of green forage and water during dry periods and seasons within the current range of the pronghorn, thereby offsetting to some extent the effects of drought and barriers that prevent pronghorn from accessing greenbelts and water, such as the Gila River and Rio Sonoyta. A planned semi-captive breeding facility will also provide a safe haven for pronghorn that hopefully will bolster the wild population. In March 2003, with funding from MCAS-Yuma and support from Bureau of Reclamation-Yuma Area Office, the Service, and Arizona Game and Fish Department, a well (Tiller Well) was drilled in Childs Valley on Cabeza Prieta NWR. In May 2003, infrastructure was put in place to pipe water to a forage enhancement plot and water trough about 1.5 miles from the well. About 6.5 acres are currently being irrigated, perennial vegetation has responded, and on June 9, pronghorn tracks were found in the plot, and the next day a pronghorn was observed in the vicinity of and moving towards the plot. In mid June a group of six (one adult male, 2 adult females, and 3 fawns) were observed near and on the plot (J. Morgart, pers. comm. 2003). Funding from MCAS-Yuma had originally been targeted for a forage enhancement plot in the Mohawk Valley of BMGR-West; however, the pronghorn recovery team requested that the funds be redirected to the Childs Valley site where it was thought pronghorn were more likely to immediately benefit from the project. MCAS-Yuma graciously agreed to redirect the funds.

Antelope Tank on the refuge has recently been redeveloped with a larger, more reliable and larger capacity, self-filling catchment system that should provide an important water source for pronghorn. Three temporary, emergency waters have been placed in remote areas of the refuge and Organ Pipe Cactus NM. Also, two badly-degraded segments of the Camino del Diablo have been repaired with airport matting, allowing access to recovery project sites. Other projects that are in development include additional emergency waters, redevelopment of two older existing wells in important pronghorn habitat on Cabeza Prieta NWR, additional forage enhancement plots, roadside watering to encourage ephemeral forage growth, initiation of a semi-captive breeding facility on the refuge, and opening of negotiations with our counterparts in Mexico for

acquiring pronghorn from Mexico for augmenting the U.S. and Mexico sub-populations. The semi-captive breeding facility, under construction on the eastern side of Cabeza Prieta NWR, will initially house five pronghorn in a kilometer square enclosure equipped with a forage enhancement facility and waters. The initial five animals are expected to be obtained from Mexico. The facility is based on a successful semi-captive facility in place for the peninsular subspecies of the pronghorn in Baja California. We anticipate that the facility will provide a safe and productive environment in which fawns will be produced for release into the wild population. These crucial projects, which we hope will pull the U.S. population back from the brink of extinction, have been cooperative efforts among the Service, Arizona Game and Fish Department, MCAS-Yuma, Luke Air Force Base, and Organ Pipe Cactus NM, with volunteer efforts from the Arizona Desert Bighorn Sheep Society, Arizona Antelope Foundation, and the Yuma Rod and Gun Club.

#### **D. Past and Ongoing Non-Federal Actions in the Action Area**

The Status of the Species section describes a variety of human activities that have affected the SOPH since initiation of livestock grazing over 300 years ago (Officer 1993). Most non-Federal activities that have affected the pronghorn are historical in nature, and pronghorn have been all but extirpated from private, state, and Tribal lands.

Before the Taylor Grazing Act of 1934, and land use designations such as Organ Pipe Cactus NM, the BMGR, and Cabeza Prieta NWR, unregulated cattle grazing was widespread in the current range of the pronghorn. Forage and precipitation is greater in the eastern portion of the current range, thus it is likely that grazing was more prevalent in BMGR-East, Cabeza Prieta NWR and Organ Pipe Cactus NM, than in BMGR-West (MCAS-Yuma 2001). However, cattle grazing presently occurs west of Volcan Pinacate and near the Sierra del Rosario in northwestern Sonora, which are as dry as much of BMGR-West; thus we suspect cattle grazing historically occurred throughout the current U.S. range. The degree to which cattle grazing may have affected soils and vegetation communities in this area is impossible to quantify. Humphrey (1987) compared vegetation in early photos taken at boundary monuments in the early 1890s with photos taken in the 1980s and could not discern any temporal differences in vegetation in what is now Organ Pipe Cactus NM, Cabeza Prieta NWR, and BMGR. However, the changes may have occurred before 1890. In reference to monument 172 at the southern end of the Quitobaquito Hills, Humphrey notes “the entire region near the spring has probably been grazed by domestic livestock since their introduction by the Spaniards in the early eighteenth century. Any grasses that might have grown there prior to that time had probably been grazed out long before the monument was erected.” Organ Pipe Cactus NM (2001) discusses possible effects of long-term grazing in pronghorn habitat, and apparent evidence and impacts of grazing still visible at Organ Pipe Cactus NM 25 years after cattle were removed.

Before the establishment of Organ Pipe Cactus NM, BMGR, and Cabeza Prieta NWR, mining occurred in many of the mountain ranges of the area. The copper mine at Ajo was operated by Phelps Dodge Corporation and others from 1911 to 1985. The open pit mine and its tailings eliminated pronghorn habitat east and southeast of Ajo. Smaller mining operations caused habitat disturbance locally, but most mines were in mountainous terrain outside of pronghorn

habitat. Earlier mining operations in the area needed large quantities of timbers for shoring which were likely obtained from bajada habitat woodlands along riparian areas.

Hunting and poaching may have been an important factor historically in the decline of pronghorn populations early in the 20<sup>th</sup> century; however, the SOPH has been protected from hunting in the U.S. for more than 50 years. We are not aware of any recent poaching events (U.S. Fish and Wildlife Service 1998a); but finding evidence of poaching would be difficult across the remote landscape inhabited by this subspecies. Recreational hunting for other species occurs within the U.S. range of the pronghorn. Of particular importance is the bighorn sheep season, which occurs in December of each year, when approximately four hunters access remote portions of Cabeza Prieta NWR and BMGR to hunt. Presence of hunters in pronghorn habitat and discharge of firearms has the potential to disturb pronghorn; however, sheep hunting occurs at a time of year when temperatures are moderate, and hunters focus their activities in the mountains whereas pronghorn are in the valleys and bajadas.

Development of agriculture, including construction of canals, roads, towns, a railroad, and other activities along the Gila River excluded pronghorn from the riparian habitats, shade, forage, and water available along the river. Similarly, construction of Sonora Highway 2, the U.S./Mexico boundary fence, and towns and agriculture along the Rio Sonoyta, excluded pronghorn from these riparian habitats, as well. Flow in the Gila and Sonoyta rivers are now much reduced or restricted to return agricultural flows or periodic flood flows. These greenbelts may have been a source of water and forage, and probably acted as buffers, to enhance survival of pronghorn during drought periods (U.S. Fish and Wildlife Service 1998a).

Numbers of undocumented immigrants and smugglers have increased dramatically in the action area. Deportable migrant apprehensions by Border Patrol agents in the Ajo Station increased steadily from 9,150 in 1996 to 20,340 in 2000 (U.S. Immigration and Naturalization Service 2001). In 2001, estimates of undocumented migrant traffic reached 1,000 per night in Organ Pipe Cactus NM alone (NPS 2001), and 150,000 for the year (Milstead and Barns 2002). Numbers of illegal crossings through the BMGR increased in the mid to late 1990s after Border Patrol stepped up their presence in border cities. Apprehensions in the BMGR by Border Patrol were 9,500, 11,202, and 8,704 in 1996, 2000, and 2001, respectively (MCAS Yuma 2003). These illegal crossing and law enforcement response have resulted in route proliferation, off-highway vehicle (OHV) activity, increased human presence in backcountry areas, discarded trash, and vehicles abandoned by smugglers. Habitat degradation and disturbance of pronghorn almost certainly results from these illegal activities. Increased illegal activities have precipitated increased law enforcement presence, with additional associated adverse effects. However, without Border Patrol efforts, the impacts from undocumented immigrants would be even greater. Some discussions are occurring between Mexican and U.S. officials about the creation of a guest worker program whereby Mexican nationals could legally cross the border to work in the U.S. If such a program was initiated, it might greatly reduce illegal immigration and law enforcement response, with concomitant reductions in habitat degradation and suspected disturbance of pronghorn that have increased so dramatically in recent years.

### **E. Past and Ongoing Federal Actions in the Action Area**

Because of the extent of Federal lands in the action area, most activities that currently, or have recently, affected pronghorn or their habitat are Federal actions. The primary Federal agencies involved in activities in the action area include the MCAS-Yuma, Luke Air Force Base, the Service, BLM, Organ Pipe Cactus NM, and Border Patrol.

Resource management on and near the BMGR is coordinated through the Barry M. Goldwater Executive Council (BEC), a group of Federal and state agency representatives with statutory authority and management responsibility for the BMGR, its resources, and adjacent Federal lands. Formalized in March 1998, the BEC provides a conduit for communication regarding resource management issues, conflicts, and planning on the BMGR. Membership on the council includes representatives from Luke Air Force Base, MCAS-Yuma, the Phoenix and Yuma field offices of BLM, Cabeza Prieta NWR and this office, Organ Pipe Cactus NM, Arizona Game and Fish Department, and Tucson and Yuma sectors of the Border Patrol. No single agency serves as the council lead and the organization operates on a consensus basis. One committee of the BEC is dedicated to reporting SOPH management activities throughout the range. The MLWA of 1999 called for the establishment of a coordinating committee to act as an advisory group to land management agencies regarding management practices on the BMGR. This committee, the Intergovernmental Executive Committee (IEC), was convened in January 2002. Core membership in the IEC includes the Departments of the Air Force, Navy, and Interior. Membership was also offered to interested federal and state agencies, counties, local governments, and Native American Tribes. The IEC meets three times each year with meetings open to the public and special interest groups.

Arizona Game and Fish Department, working in cooperation with a number of Federal agencies, has captured and radio-collared a total of 35 adult SOPH since 1994; 22 in 1994, nine in 1997/98, and four in 2000. Five pronghorn captured in 1994 died within 1-33 days post-capture. Three of these mortalities were from unknown causes, while two appeared predator-related (mountain lion and coyote). Since it is unusual to have this many animals die within 40 days post-capture, the direct or indirect effects of capture myopathy, was a suspected factor in their deaths. Capture and handling procedures were immediately modified and no losses related to capture myopathy have occurred in subsequent capture operations. A sixth animal died from a broken neck sustained during capture operations in December 2000. Despite these detrimental effects, data collected through radio telemetry are ultimately of great benefit to the conservation of the subspecies. Telemetry data provide information regarding habitat use and requirements, movement patterns, and increase the validity of population estimates. No pronghorn have been captured or telemetered since 2000.

In the following discussion, we have categorized Federal actions affecting the pronghorn as: 1) those actions that have not yet undergone section 7 consultation (although in some cases consultation has been completed on components of the Federal activity), and 2) Federal actions that have undergone consultation.

*Federal Actions For Which Consultation Has Not Been Completed*Management at Cabeza Prieta NWR

Over 90 percent of Cabeza Prieta NWR was designated by Congress as wilderness in the 1990 Arizona Wilderness Act. To help maintain wilderness character, no vehicular traffic is allowed except on designated public use roads. Vehicles may be parked up to 50 feet from the center of the roads in areas previously used by other vehicles. All other off-road travel is prohibited. Visitors are encouraged to practice a "leave no trace" ethic. Recreational activities on the Cabeza Prieta NWR include backpacking, hunting, photography, camping, rock climbing, mountain biking, and driving on roads. Before entering, visitors must obtain a valid Refuge Entry Permit and sign a Military Hold Harmless Agreement.

Four-wheel drive vehicles are required on all routes except Charlie Bell Road where 2-wheel drive high-clearance vehicles may be driven. Driving in wet areas is prohibited and visitors are encouraged to not travel during wet conditions due to possible damage to refuge roads. In addition to the prohibitions mentioned above, the following activities are prohibited: dumping of litter, sewage, or liquid waste; firearms, except as authorized in writing by the Cabeza Prieta NWR manager; prospecting, removal, or disturbance of sand, rock, gravel, or minerals; rock hounding; excavating or removing objects of antiquity, cultural artifacts, or paleontological artifacts; trapping; collecting, possessing, molesting, disturbing, injuring, destroying, removal, or transportation of any plant, or animal, or part of the natural flora and fauna on the NWR (exceptions to the above are legally taken game); wood campfires; and unleashed pets.

The management plan for the Cabeza Prieta NWR includes an endangered species management component (U.S. Fish and Wildlife Service 1998b). Activities in this component include the use of remote sensors in coordination with the Border Patrol, an increase in monitoring, forage enhancement plots, a semi-captive breeding facility, and the possibility of the establishment of experimental waters for pronghorn. Specific objectives concerning management goals for the pronghorn were presented in a preliminary draft Comprehensive Conservation Plan (CCP) for the Cabeza Prieta NWR (U.S. Fish and Wildlife Service 1998b) and included coordination with Arizona Game and Fish Department to conduct aerial surveys, weekly telemetry flights, radio-collaring operations, digital vegetation mapping, food plot feasibility studies, installation of water developments with photomonitors to document pronghorn use, telemetry tracking using remote data loggers, and coordination with Mexican authorities on pronghorn populations south of the border. Work continues on the CCP; the draft EIS is expected to be completed in 2003. When the CCP is drafted, we will conduct section 7 consultation on that plan if listed species or critical habitat may be affected. In the interim, we conduct section 7 interagency consultation on individual actions when they are proposed.

Cabeza Prieta NWR provides habitat for the pronghorn and is actively working to conserve the species. However, the presence of humans within pronghorn habitat may constitute a major disturbance factor. Furthermore, human presence may restrict pronghorn access to cover and/or forage and effectively create a barrier to movement.

Tucson Sector of the Border Patrol

The Tucson Sector Border Patrol section 7 consultation is not yet complete (consultation number 02-21-99-I-138). We have received three draft BA packages and expect to receive a fourth revised draft in the near future. This consultation encompasses all field activities conducted by the Border Patrol-Tucson Sector, as part of the program to detect, deter, and apprehend undocumented immigrants and drug traffickers. Also included will be the patrol operation, Operation Grip, initiated in 2002 and is continuing in 2003, which is being conducted on the Los Vidrios Trail and Davidson Canyon areas of the Agua Dulce Mountains on Cabeza Prieta NWR. As part of this operation, trailers, which serve as living quarters for Border Patrol agents, have been placed near Bates Ranch on Organ Pipe Cactus NM. Additionally, we are currently in consultation with Border Patrol on a proposal to place six emergency beacons within pronghorn habitat so that undocumented aliens in distress can call for help. Use of helicopters to respond to emergency call buttons activation on the towers may result in overflights of the proposed semi-captive breeding facility in Childs Valley and are under discussion.

The Tucson Sector is comprised of nine stations. Activities within the Ajo Station have the greatest potential to adversely affect pronghorn. Adverse effects may result from patrol road activities, drag road activities, off-road operations, aircraft overflights, and the use and maintenance of sensors. Furthermore, the potential for disturbance to pronghorn due to human presence may increase in areas where agents live on site (i.e., Operation Grip). Border Patrol activities can be beneficial as well, in that they deter illegal border crossings, foot traffic, and off-road vehicles in pronghorn habitat associated with undocumented aliens and smuggling.

Patrol roads used by Border Patrol agents are typically public or private ranch roads. Although the Border Patrol is not the primary user of these roads, they do have the potential to encounter SOPH during patrols and cause them to flee the area. The Border Patrol monitors tracks of undocumented immigrants on drag roads (dirt roads that are regularly cleared by dragging tires behind a vehicle and then monitored for human tracks). Less than 10 miles of drag roads are used by the Ajo Station. Pronghorn appear to have an affinity for drag roads as the process of preparing the roads promotes forb growth (J. Hervert, pers. comm. 1999). Additionally, these roads may be utilized by pronghorn as bedding areas due to greater predator detection resulting from increased visibility (J. Hervert, pers. comm. 1999). Pronghorn attracted to these areas may be adversely affected by the presence of patrols and road preparation activities. Sensors are placed at strategic locations along the U.S.-Mexico border on established roads or trails within known travel corridors to detect illegal activities. The Ajo Station uses and maintains approximately 85-90 sensors during daily operations. Sensor installation and/or maintenance activities could disturb pronghorn if they are in the immediate area. However, these disturbances should be infrequent and short in duration.

Off-road activities include agents on foot, the use of OHVs, including four-wheel drive vehicles, dirt bikes, and all-terrain vehicles. These activities may disturb pronghorn and disrupt normal behavioral activities. Motorized off-road activities also degrade pronghorn habitat. In addition to off-road activities, one routine helicopter patrol route is flown from Why along a southwesterly route to the Agua Dulce Mountains. Additional helicopter activities may occur

throughout the range of the pronghorn, and helicopters may hover and land. Areas where low-level helicopters are used have the highest potential for serious disturbance to pronghorn, such as near the breeding facility in Childs Valley. Evidence from other subspecies of pronghorn and other ungulates suggests that pronghorn may exhibit elevated heart rates, may flee, and could alter habitat use in response to low-level helicopter flights (Workman *et al.* 1992).

#### Yuma Sector Border Patrol Beacon Stations

After initiating emergency consultation, the Yuma Sector Border Patrol installed six emergency beacon stations (panic buttons) on the BMGR as a means to reduce mortality of illegal immigrants. The installation of the stations resulted in little habitat disturbance; however, the presence of the electronic stations may increase human presence in these areas (undocumented immigrants, and maintenance and rescue crews) and therefore represents an additional disturbance factor for pronghorns. To date, the beacon stations have been activated several times. The Yuma Sector also placed a temporary trailer at Christmas Pass on Cabeza Prieta NWR, just west of the current pronghorn distribution. In 2003, the Yuma Sector is proposing to move that trailer to the Pinta Sands area on the El Camino and discussions are currently underway with the Service. Yuma Sector Border Patrol has requested reinitiation of consultation on their ongoing activities, including the operation and maintenance of these beacons. We expect to complete a biological opinion by the end of September 2003.

#### Smuggler/Drug Interdiction

We are aware of U.S. Customs, Drug Enforcement Authority, and Arizona Army National Guard smuggler or drug interdiction activities in pronghorn habitat, including vehicle and helicopter activities. However, none of these agencies have provided information to us about the extent or types of activities they conduct, and no consultation has occurred on these activities. National Guard helicopter operations may no longer be occurring in pronghorn habitat; however, we are aware of low-level helicopter flights as late as February 2001. ARNG is not a proponent of these Federal actions, but will cooperate with the lead Federal agency if requested to do so. These activities are not part of ARNG's WAATS project. Due to a lack of information, we cannot evaluate the extent to which these activities may affect SOPH or their habitats. However, vehicles and low-level helicopter flights can cause pronghorn to run, which can have adverse physiological effects, particularly when the animals are stressed, such as during drought (see Effects of the Proposed Action).

#### *Federal Actions Addressed in Section 7 Consultations*

As part of our comprehensive discussion of all past and present actions affecting pronghorn within the action area, we describe below all biological opinions issued to date that may affect the pronghorn.

Four opinions addressed projects with minor effects to the pronghorn. Two opinions (consultation numbers 02-21-83-F-0026 and 02-21-88-F-006) covered capture and collaring of pronghorn for research purposes, with no incidental take of pronghorn anticipated. Consultation

number 02-21-88-F-0081 involved installation of a water source in the Mohawk Valley for pronghorn, with no incidental take anticipated. Consultation number 02-21-89-F-008 addressed change in aircraft use by Luke Air Force Base on the BMGR, including change in aircraft type from the F-15A/B to the F-15E, and an increase in nocturnal flights (F-15E Beddown Project). We anticipated take of pronghorn in the form of harassment as a result of aircraft overflights. Reasonable and prudent measures to minimize take included: 1) development of long-term studies to determine the effects of overflights on the pronghorn, 2) if effects of overflights are identified, Luke Air Force Base would work with us to eliminate them, and 3) work involving pronghorn would be carried out in accordance with appropriate state and Federal permits. This project was later incorporated into the biological opinion on Luke Air Force Base' activities on the BMGR, discussed below. Intra-Service consultation for recent emergency conservation activities conducted by Cabeza Prieta NWR and AGFD, including water tanks, forage enhancement plots, and the proposed semi-captive breeding facility, concluded that no incidental take of pronghorn was anticipated. No incidental take is known to have occurred as a result of these emergency actions.

Nine biological opinions evaluated major projects with greater effects to pronghorn:

#### Border Patrol Activities in the Yuma Sector, Wellton Station, Yuma, Arizona

This biological opinion (consultation number 02-21-96-F-0334), issued September 5, 2000, addressed all Border Patrol activities along the United States/Mexico border in Yuma County from the Colorado River to about the area of Pinta Sands at the south end of the Sierra Pinta Mountains. The Yuma Sector has requested reinitiation of consultation; we expect a revised opinion will be produced by the end of 2003. Border Patrol activities within the Yuma Sector/Wellton Station included helicopter and ground patrols; drag road preparation and assessment of road maintenance; remote sensor installation and maintenance; apprehensions and rescues; and assistance to other sectors and agencies. To reduce adverse effects on pronghorn, the Border Patrol agreed to implement the following measures: 1) purchase new, quieter MD600N helicopters to replace existing OH-6As; 2) contact the Arizona Game and Fish Department weekly for an update on weekend telemetry flights to avoid areas of pronghorn concentration; 3) modify helicopter flights to avoid fawning areas during the three peak months of the fawning season (April-June); 4) make confidential monthly reports to the manager of Cabeza Prieta NWR detailing the law enforcement actions and wildlife observations made during the previous month; 5) finalize the Memorandum of Understanding between the Border Patrol and Cabeza Prieta NWR to address objectives that will minimize potential conflicts including limiting routine patrols and off-road use in wilderness and providing a framework for cooperation; and 6) conduct an annual interagency meeting with Cabeza Prieta NWR, this office, and BLM to present the annual report and discuss ways to improve coordination.

Disturbance to pronghorn was anticipated as a result of on-the-ground Border Patrol operations, and direct injury or mortality of pronghorn as a result of collision with Border Patrol vehicles or by low-level helicopter flights abruptly approaching and startling pronghorn, which may result in injury or energetic stress, particularly during drought. Pronghorn may also be adversely affected by noise and visual impacts of helicopter overflights. The increased energy expenditure caused

by sudden or loud noises may lead to lower reproductive output and/or survival. The potential for detrimental effects to pronghorn may be greatest during the peak months of the fawning season (April-June). Habitat disturbance due to off-road vehicle travel would also result. During reinitiation of this consultation in 2003, we intend to ensure that helicopter flights do not occur over or near the semi-captive breeding facility, which should be completed in late 2003.

We determined that the proposed action was not likely to jeopardize the continued existence of the pronghorn. We anticipated take in the form of harassment that is likely to injure up to one pronghorn in 10 years. The following reasonable and prudent measures were provided: 1) minimize injury of pronghorn; 2) monitor and study reactions of pronghorn on BMGR to Border Patrol activities; and 3) provide a means to determine the level of incidental take that results from Border Patrol activities. Several conservation recommendations were also provided.

The Border Patrol submitted an annual report of their activities in 2001, in which they stated that they were in the process of implementing the reasonable and prudent measures, terms and conditions, and conservation recommendations that were part of the proposed action. They have not replaced the OH-06A helicopters with quieter models, as they agreed to during consultation in 2000; however, they are investigating other single turbine helicopters with low noise profiles. We are not aware of any incidental take attributable to Border Patrol activities in the Yuma Sector's Wellton Station resulting from the proposed action.

#### BLM's Lower Gila South Management Area

Three biological opinions address BLM's Lower Gila South Management Area. The Lower Gila South Resource Management Plan-Goldwater Amendment (consultation number 2-21-90-F-042), proposed specific and general management guidance for non-military activities on the BMGR. Of particular importance for pronghorn was proposed management of recreation. Use of the BMGR is by permit only. The number of BMGR recreational use permits issued by the BLM field offices increased dramatically in the late 1990s, with a total of 893, 2545, and 3528 permits issued in 1998, 1999, and 2000, respectively. Permits are also issued by the USAF, Marine Corps, and Cabeza Prieta NWR. Permits are valid for any part of the BMGR that is open to public recreation. The presence of an increasing number of humans creates a disturbance risk to pronghorns, and OHVs may constitute a mortality factor. The OHV roads and heavily used vehicle-camping areas degrade habitat and may disturb pronghorn, as well as create barriers to pronghorn movement. No incidental take was anticipated. The non-jeopardy biological opinion, issued April 25, 1990, was programmatic, requiring BLM to consult when site-specific projects are proposed. To date, no site-specific formal consultations have been conducted. In November 2001, BLM's management of the range ceased and the Lower Gila South Management Plan-Goldwater Amendment will be replaced by the BMGR INRMP (see section entitled "Recreation, Natural Resources, and Cultural Resources Management" herein).

The Lower Gila South Habitat Management Plan (HMP) (consultation number 02-21-89-F-0213) provided management guidance for both specific and general actions in southwestern Arizona. Four actions were addressed in the HMP, including an exchange of 640 acres near Ajo, rehabilitation work on two catchments, and assessment of livestock removal from pronghorn

habitat. Exchange of land out of public ownership may facilitate development or other uses that would preclude use by pronghorn. No incidental take was anticipated. The non-jeopardy opinion was issued on May 15, 1990.

The biological opinion for the Lower Gila South Resource Management Plan and Amendment (consultation number 02-21-85-F-0069) addressed programmatic management of lands in southwestern Arizona, including livestock grazing, wilderness, cultural resources, fire, minerals and energy, recreation, wildlife management, wood cutting, Areas of Critical Environmental Concern, and other land uses. The biological opinion concluded that OHV restrictions and designations of Areas of Critical Environmental Concern would benefit pronghorn, but wood cutting, recreation, grazing activities, mining, and designation of utility corridors would adversely affect pronghorn. Incidental take of the pronghorn was anticipated, but not quantified. Any decline of forage quality or increase in the amount of fencing was judged to indicate that incidental take had been exceeded. Reasonable and prudent measures and terms and conditions to minimize take included: 1) modifying grazing allotment fences to allow passage of pronghorn, 2) improving habitat conditions for the pronghorn, and 3) minimizing human disturbance. We provided conservation recommendations to monitor pronghorn use of the area, assess pronghorn use at livestock waters, and consolidate lands through land exchanges. The non-jeopardy biological opinion was issued on March 27, 1998. In accordance with the opinion, BLM has monitored livestock grazing, and allotment fences have been modified to allow passage of pronghorn. Enforcement of vehicle and camping regulations has been increased south of Ajo.

In summary, the biological opinions for BLM's Lower Gila South Planning Area anticipated adverse effects to pronghorn and their habitat from livestock grazing, recreation, a land exchange, wood cutting, mining, and designation of utility corridors, resulting in an anticipated unspecified amount of take. We determined that the proposed actions were not likely to jeopardize the continued existence of the pronghorn. However, with the change in management of the BMGR from the BLM to DoD, the BLM is no longer conducting any management actions that require consultation or are covered by this biological opinion.

#### Organ Pipe Cactus National Monument - Widen North Puerto Blanco Road

The biological opinion for the Widen North Puerto Blanco Road project (consultation number 02-21-01-F-0109) addressed impacts to pronghorn from the proposed construction of new recreational infrastructure (although consultation on this project is completed, construction has not yet begun due to concerns about the pronghorn). The project was anticipated in concept in the November 16, 2001, opinion on Organ Pipe Cactus NM's General Management Plan, but it was recognized at the time that project-specific consultation would be needed. The project would widen the first 5.1 miles of North Puerto Blanco Road to allow for two-way travel, construct a vehicle turn-around, construct four interpretive pullouts with educational kiosks, and construct a parking area with picnic tables, a restroom facility, and educational kiosks at the terminus of the two-way segment. North Puerto Blanco Road would be widened from 14 feet to 20 feet, concrete low-water crossings would be installed in washes, and some steeper portions of the road would be paved for safety and erosion control.

The project is expected to result in effects to pronghorn from 11 acres of habitat loss, increased disturbance from recreational activities, and movement barrier effects from increased use of the road and recreational activities. Use of the new two-way road, pullouts, and terminus facility may curtail the movements of pronghorn into the area, effectively barring the species from a portion of their range. These effects are expected to be offset by Organ Pipe Cactus NM's program of annual road and backcountry closures and by delaying construction until the pronghorn's status has improved. Closing these facilities during the crucial fawning and summer dry seasons should largely eliminate these effects during periods when pronghorn are most likely to be in the monument and need access to these areas.

Organ Pipe Cactus NM proposed the following conservation measures to minimize effects to pronghorn: 1) institute a monitoring program such that any pronghorn detected in Organ Pipe Cactus NM will result in a 5-mile diameter buffer zone around the animal which will be closed to all activity, except for a minimal amount of administrative traffic; 2) limit backcountry permits to areas east of SR 85 and south of North Puerto Blanco Drive from March 15 to July 15; 3) close North Puerto Blanco Drive annually to public use from March 31 to July 15, and close the Bates Well Road and Pozo Nuevo Road to public use from March 15 to July 15; 4) continue to place temporary waters in backcountry areas during the dry season for pronghorn; 5) delay timing of construction of the project until after the fawning and summer dry seasons (March 15-July 15); and 6) 6) construction will also be delayed until significant rainfall occurs and most pronghorn move out of the Monument to other areas of their range. We determined that the project was not likely to jeopardize the continued existence of the pronghorn. The non-jeopardy biological opinion was issued October 29, 2002. Based on discussions with Park staff, proposed conservation measures are being implemented.

#### SR 85 Roadway and Drainage Improvements Project, Organ Pipe Cactus NM

On May 8, 2003, we issued a biological and conference opinion for the roadway and drainage improvements to SR 85 through Organ Pipe Cactus NM (consultation number 2-21-02-F-0546) The action agency was Organ Pipe Cactus NM. The project included placement of a pavement overlay on the existing roadway width (26 feet) for the length of the project (MP 80.50 to MP 57.80), as well as overlay at existing intersections with Organ Pipe Cactus NM crossroads and the Port-of-Entry at Lukeville. Also proposed were a 6-foot-wide roadway shoulder to be built up to match the elevation of the new roadway pavement, replacement of existing ford concrete walls at 24 low-water wash crossings, modification at the Organ Pipe Cactus NM Visitor Center that would combine the entrance and exit at the site of the existing exit, as well as the construction of right and left turn lanes and a southbound acceleration lane to serve the new entrance/exit, construction of two interpretive waysides for use by motorists, including visitors to Organ Pipe Cactus NM, construction of a concrete box culvert in Cherioni Wash (MP 70.29) to eliminate the existing dip-crossing, and other roadway improvements associated with these features. Included in the proposed action were a number of conservation measures to minimize effects to listed species. These included: salvage of vegetation and revegetation of 8.27 acres, installation of gates on the two SR 85 waysides so they can be closed to public use during the pronghorn fawning period (March 15 - July 15), vegetation clearing adjacent to SR 85 for visibility, a literature review of pronghorn-road interactions and recommendations for reducing

the likelihood of pronghorn road mortality or injury, placement of temporary water sources in key areas at critical times for pronghorn, a monitoring program to assess effectiveness of temporary waters, continuation of participation in and financial support of the pronghorn emergency recovery projects, an annual report of pronghorn conservation efforts addressing annual progress for each of the measures listed here and in other current biological opinions on the pronghorn, contribution to the 51 recovery projects identified by the SOPH recovery team, timing of construction to avoid the pronghorn breeding season, and coordination with us and the Arizona Game and Fish Department to determine pronghorn presence in the Monument prior to construction. NPS will only begin construction after receiving written authorization from us to proceed, based on pronghorn telemetry or overflight survey information (note - no pronghorn are currently telemetered).

We concluded that the proposed action was not likely to jeopardize the continued existence of the SOPH. No take of pronghorn was anticipated. We included three conservation recommendations for pronghorn.

### *5 Remanded Biological Opinions*

In response to *Defenders of Wildlife, et. al., v. Bruce Babbitt, et. al.* (Civil Action No. 99-927 [ESH]), Judge Ellen Huvelle of the United States District Court (Court) for the District of Columbia issued a Memorandum Opinion and Order on February 12, 2001. The Court found that we failed to address the impact of various Federal actions on the SOPH when added to the environmental baseline and failed to include in the environmental baseline the impacts of all Federal activities in the area that may affect, directly or indirectly, the pronghorn.

The Court ordered us to produce, in consultation with the defendants, revisions of the following biological opinions: Luke Air Force Base (August 1997), Army National Guard (ARNG) (September 1997), BLM (December 1997), MCAS-Yuma (April 1996), and Organ Pipe Cactus NM (June 1997). The Court further ordered that we, in consultation with the Federal agencies whose biological opinions have been remanded, must reconsider those portions of the opinions that have been found to be contrary to the dictates of the Act. This included the scope of the action area, analysis of the environmental baseline, and analysis of the effects of incidental take in context with a revised environmental baseline. The remanded biological opinions were issued on November 16, 2001. A reinitiated opinion on the BLM's grazing allotments was completed in September 2002. In the following discussion, we describe both the original and remanded/reinitiated opinions for these five consultations.

#### BLM grazing allotments in the vicinity of Ajo, Arizona

The original biological opinion (consultation number 02-21-94-F-0192), issued December 3, 1997, addressed effects to pronghorn resulting from issuance of grazing permits on five allotments, four of which are located near Ajo and Why (Cameron, Childs, Coyote Flat, and Why allotments); and the fifth near Sentinel (Sentinel allotment). All but portions of allotments east of Highway 85 were considered to be within the current distribution of the SOPH. According to the BLM, livestock use of the five allotments had been relatively low in the previous ten years;

however, the effects of stocking the allotments at any level had not been analyzed. Monitoring of the Coyote Flat and Why allotments had not occurred. The BLM permittees had not fully stocked the Cameron, Why, Sentinel, and Childs allotments for a sustained period of time. The Coyote Flat Allotment had been billed for full stocking. According to the BLM, monitoring data had not shown overutilization of the vegetation or a change in vegetation composition. The BLM estimated that if allotments were stocked at permitted levels, forage utilization rates could approach 40 percent. Preliminary data from the BLM and the Arizona Game and Fish Department showed that there is little dietary overlap between pronghorn and cattle. Because of this, the amount of forage on allotments, and the likely utilization levels, we found that adequate forage for the pronghorn should be available. Maintenance of livestock waters, fences, and other improvements may temporarily disrupt pronghorn activity. Pronghorn may also become entangled in livestock fences.

We determined that the proposed action was not likely to jeopardize the continued existence of the pronghorn. Incidental take of one pronghorn was anticipated to occur in the form of harassment or death due to grazing management activities during the 15-year proposed action. The following reasonable and prudent measures were provided to minimize take of pronghorn: 1) minimize impacts to pronghorn from grazing and 2) minimize habitat loss, degradation, and fragmentation of pronghorn habitat. The opinion included the following conservation recommendations: develop allotment management plans for each allotment and monitor pronghorn use within Cameron, Coyote Flat, Sentinel, and Why allotments.

The 1997 biological opinion was remanded to us by the Court on February 12, 2001. A final biological opinion was issued on November 16, 2001. The Federal action considered in that opinion was the issuance of a 10-year grazing permit on the five allotments. However, because the BLM agreed to finalize their Rangeland Health Allotment Evaluations conducted during 2001, and to then reinitiate consultation regarding the continued grazing of these allotments, the 2001 biological opinion analyzed the effects of the proposed action only for the interim period. In this biological opinion we concluded that grazing activities within the interim period would not jeopardize the continued existence of the SOPH. Further, we concluded that these actions would not result in take of SOPH. The opinion included a number of g conservation recommendations, as well.

The BLM reinitiated consultation on the Ajo allotments on April 23, 2002. The proposed action was the re-issuance of 10-year grazing permits on the five allotments addressed in previous opinions. The BLM included a number of very comprehensive conservation measures to be implemented according to a prioritized schedule. These measures included: 1) BLM will only authorize ephemeral grazing on the Cameron, Coyote Flats, Childs, and Why allotments in accordance with ephemeral use criteria in their Arizona Rangelands Standards and Guidelines and if both of the following conditions are met: a) In years where ephemeral plant production is geographically limited, ephemeral forage on the Ajo allotments is not an important part of ephemeral forage available to pronghorn, either in terms of forage quality or acreage of green-up, and b) the U.S. pronghorn population must be above 100 and increasing; 2) BLM will implement a forage enhancement project on the Cameron Allotment starting in fiscal year 2004, 3) BLM will develop a “drought policy” for the 5 allotments to more consistently guide

authorization of grazing use in SOPH range when drought situations occur, 4) BLM will install ground-level drinking troughs for use by pronghorn, outside of the corrals, on 3 livestock wells in the Cameron Allotment, 5) During 2004-2006, BLM will install lay-down fences along portions of the southwestern boundaries of the Cameron Allotment to allow unimpeded passage of pronghorn. These portions of the fence will be laid down, beginning on May 1 of each year, with the reinstallation process to begin no sooner than August 31 and to be completed by September 15 of each year, 6) BLM will construct a fence to contain livestock in the northern part of the Cameron Allotment from May 1 to September 15 of each year, 7) BLM will provide this office with full descriptions, including photographs and diagrams, of all existing livestock water sources within the allotments west of SR 85. Based on the results of the study described below in 8, BLM will work with us to determine any necessary modifications to each water source to a) reduce the potential of the source to provide breeding habitat for biting midges (may require restricting access to some sources through fencing or breaching dams and allowing the sources to dry); b) provide safe access for SOPH; and c) ensure that such modifications do not result in adverse effects to other listed species in the vicinity (e.g., cactus ferruginous pygmy-owls may use the more vegetated water sources), and 8) BLM will initiate or cooperate in development of a study of the potential for disease transmission from livestock to pronghorn in the Ajo Allotments.

In the September 30, 2002, opinion, we concluded that the proposed action is not likely to jeopardize the continued existence of the pronghorn. This conclusion was based in part on full and prompt implementation of the conservation measures. To date, BLM has prohibited ephemeral grazing, developed a drought policy, surveyed fence lines, purchased some fencing materials, inventoried water sources west of SR 85, funded a pilot disease study, implemented seasonal route closures, contributed \$15,000 towards survey and monitoring efforts, and made other progress in implementing the conservation measures. BLM's conservation measures would also eliminate any potential for take of pronghorn from the project. Four conservation recommendations were included in the opinion.

Thus far, compliance with the conservation measures has been good. BLM was to submit annual reports to us on implementation of their action, including the conservation measures. The first report was received in March 2003. Consistent with the opinion, a report inventorying all livestock waters on the allotments west of SR 85 (measure 7) was received by us in November 2002, and BLM initiated a study of disease transmission in the Ajo allotments with Arizona Game and Fish Department in 2003 (measure 8).

#### Marine Corps Air Station-Yuma in the Arizona Portion of the Yuma Training Range Complex

Consultation began on the Arizona portion of the YTRC in 1995. The original biological opinion (consultation number 02-21-95-F-0114), issued on April 17, 1996, addressed all proposed and authorized actions on the BMGR by MCAS-Yuma, including proposed changes to military flights over Cabeza Prieta NWR, ongoing flights over BMGR, and operation of various training facilities such as landing strips, a rifle range, targets, a parachute drop zone, a transmitter/telemetry system, and ground support areas. MCAS-Yuma conducts WTI courses

twice a year (March-April and October-November - see Description of the Proposed Action in 2001 remanded consultation).

Ground-based activities, such as those of troops and vehicles at ground-support areas were likely to adversely affect pronghorn habitat use. Over the entire project area, ground-support areas in potentially occupied pronghorn habitat would encompass approximately 32.4 mi<sup>2</sup>. Numerous pronghorn have been located in recent years in R-2301W on the BMGR and the Cabeza Prieta NWR east of the Baker Peaks, Copper, and Cabeza Prieta mountains. In this area, ongoing and proposed military ground-based activities have the greatest potential for adversely affecting pronghorn. Military overflights do not cause habitat degradation, but pronghorn may respond with increased heart rates and flee from aircraft, particularly low-level helicopters. The increased energy expenditure associated with flight behavior may lead to lower reproductive output and/or survival. Additionally, pronghorn may avoid flight paths, which may result in an indirect loss of useable habitat. In areas where helicopters fly particularly low and create more noise and greater visual stimuli, disturbance to pronghorn would be expected to be greater. Ordnance delivery may also adversely affect pronghorn. Pronghorn use both the North and South TACs on BMGR-E, and ordnance, live fire, and shrapnel could potentially strike and kill or injure a pronghorn. Furthermore, pronghorn could be killed or injured during an encounter with unexploded live ordnance on the ground. MCAS-Yuma proposed measures to reduce the direct and indirect impacts of the proposed action, including measures to reduce or eliminate take of SOPH and to minimize destruction and degradation of habitat.

We determined that the proposed action was not likely to jeopardize the continued existence of the pronghorn. Incidental take of one pronghorn per 10 years was anticipated in the form of direct mortality, and undetermined numbers of pronghorn were anticipated to be taken in the form of harassment by low-level fixed wing and helicopter flights, military vehicles, or other activities authorized, funded, or carried out by MCAS-Yuma. The following reasonable and prudent measures were provided to minimize take of pronghorn: 1) MCAS-Yuma will develop personnel and visitors educational/information programs and operational procedures; 2) to the extent practicable, military activities shall be located outside of pronghorn habitat; and 3) incidental take resulting from the proposed action will be monitored and reported to us. Three conservation recommendations were included in the opinion, as well.

In 1999, MCAS reported that no pronghorn habitat was modified, Range Management received no reports of SOPH encounters, and all air and ground crews were briefed on the requirements of the opinion. We are not aware of any incidental take of pronghorn attributable to MCAS-Yuma YTRC activities. On March 18, 1998, an amendment was requested on the consultation by MCAS-Yuma. This request slightly changed the description of the equipment and personnel to be used in the Stoval Field exercise area. We determined that the changes would have no additional effects not already anticipated in the biological opinion.

The 1996 biological opinion was remanded to us by the Court on February 12, 2001. During consultation, MCAS-Yuma proposed 26 conservation measures aimed at the reduction of adverse effects of the proposed action on the environment, including impacts to the SOPH (Dames and Moore 1995; MCAS -Yuma 1995, 1997, 2001; letter from MCAS-Yuma to us dated October 15,

2001). We concluded that the proposed action would not jeopardize the continued existence of the SOPH. Further, we anticipated that no more than six SOPH would be incidentally taken as a result of the proposed action. The incidental take was expected to be in the form of harassment. This incidental take provision will be reviewed concurrent with subsequent reviews of the BMGR INRMP, which will occur every five years. The following reasonable and prudent measure was provided to minimize take of pronghorn: MCAS-Yuma shall modify low-level helicopter use to avoid areas of significant pronghorn use to minimize adverse effects from helicopters on the pronghorn and its habitat, particularly areas important for fawns and their mothers. The opinion included several conservation recommendations, as well. We issued the final remanded biological opinion on November 16, 2001.

### Organ Pipe Cactus NM General Management Plan

The biological opinion (consultation number 02-21-89-F-0078), issued June 26, 1997, addressed implementation of Organ Pipe Cactus NM's GMP. The purpose of the GMP is to guide management for the next 10-15 years. Plan elements included: 1) working with Arizona Department of Transportation to ensure continued travel and commerce on SR 85 while enhancing resource protection, 2) seeking designation of Organ Pipe Cactus NM as the Sonoran Desert National Park, 3) establishment of partnerships to share facilities, staff, and costs in Why and Lukeville, 4) increased wilderness and development of an interagency wilderness and backcountry management plan, 5) changes in trails at Quitobaquito, 6) changes in facilities in the Twin Peaks area, 7) increased primitive camping and designated trails, and 8) full implementation of the Organ Pipe Cactus NM Cultural Resources Management Plan.

To reduce adverse effects on pronghorn, Organ Pipe Cactus NM proposed the following: 1) pursue an agreement with Arizona Department of Transportation to establish a vehicle for continued communication regarding road-related issues, construct underpasses at known movement corridors to facilitate safe passage of pronghorn under the highway, and establish a program to explore other measures to better understand and subsequently reduce the impacts of SR 85 on pronghorn; 2) continue working with the Arizona Department of Public Safety to enforce the existing speed limit within Organ Pipe Cactus NM; 3) convert the bottom strands of Organ Pipe Cactus NM's north and south boundary fences to smooth wire to encourage pronghorn movements between Organ Pipe Cactus NM and surrounding areas; 4) educate motorists about the plight of pronghorn using a variety of interpretive media in an effort to encourage lower speeds and increased awareness of wildlife use of the highway corridor; 5) continue to serve as a member of the Interagency Core Working Group for SOPH recovery and implement activities outlined in the recovery plan, including development of a monitoring program; and 6) monitor visitor use and restrict access where necessary to minimize the potential for disturbance to pronghorn.

Recreational activities at Organ Pipe Cactus NM include hiking, camping, horse-back riding, and biking. These activities can disturb pronghorn and degrade habitat. Maintaining and/or adding hiking trails at Organ Pipe Cactus NM is likely to maintain or increase visitor presence in pronghorn habitat, resulting in disturbance to pronghorns. All proposed facilities would be located within areas of existing development and would involve relatively small tracts of land

surrounded by larger areas of undisturbed habitat. However, development of facilities that result in increased visitor use may adversely affect the pronghorn. Increased use of some frontcountry and backcountry areas has the potential to adversely affect pronghorn if it causes an alteration in behavior or habitat use. Increased visitation to Organ Pipe Cactus NM was also expected to result in increased traffic along SR 85, adding to the barrier effect of existing traffic patterns. Approximately 22 miles of SR 85 lie within Organ Pipe Cactus NM. We concluded that the highway is a deterrent to expanding pronghorn populations, and resulting modified behavioral patterns may lead to a reduction in genetic exchange and viability, and therefore a reduction in the ability of pronghorn to adapt to environmental change.

We determined that the proposed action was not likely to jeopardize the continued existence of the pronghorn. Incidental take in the form of injury or death to one pronghorn associated with traffic on SR 85 was anticipated. The following reasonable and prudent measures were provided to minimize take of pronghorn: 1) work with agencies to implement actions to reduce effects of current and future traffic patterns on SR 85; 2) modify fences for pronghorns; 3) educate motorists on pronghorn vulnerability to traffic; and 4) monitor use and restrict access where necessary to minimize pronghorn disturbance. One conservation recommendation was included in the opinion. No incidental take of pronghorn associated with the proposed action has been documented.

The 1997 biological opinion was remanded to us by the Court on February 12, 2001. The GMP had changed since the 1997 plan was released, most notably with regard to projects that were ongoing or had been completed, and the addition of new projects. To reduce adverse effects, Organ Pipe Cactus NM included 14 conservation measures for SOPH in its proposed action: 1) closing Pozo Nuevo Road to public use at its intersection with Puerto Blanco Drive from March 15 to July 15; 2) closing Bates Well Road to public use at the northern monument boundary from March 15 to July 15; 3) closing North Puerto Blanco Drive at a point approximately 5.1 miles from the Visitor's Center, and also at its intersection with Pozo Nuevo Road from April 1 to July 15; 4) implementing a pronghorn monitoring program and closing areas within a 5 mile diameter of known pronghorn locations, specifically targeting Puerto Blanco Road for potential closure between March 1 and March 31; 5) restricting backcountry use, from March 15 to July 15, to areas east of SR 85 and south of North Puerto Blanco Drive; 6) limiting future development to the area south of North Puerto Blanco Drive and east of Senita Basin Road/Baker Mine Trail/Dripping Springs Mine Trail and limiting timing of construction to occur outside the pronghorn fawning and summer dry seasons (March 15 to July 15); 7) establishing a 3-year experimental pronghorn crossing zone on SR 85 from milepost 67 to 71, consisting of a temporary speed limit reduction to 35 - 45 mph from 0400 - 0900 hours seasonally, including a monitoring program to assess effectiveness; 8) removing the north boundary fence if BLM agrees to remove livestock from the Cameron and Coyote Flat allotments for a period of at least 20 years, including at least a 2 year advance notice of BLM's intention to return livestock to these areas; 9) placing temporary water sources in key areas, primarily during the dry season, and including a monitoring program to assess effectiveness of temporary waters; 10) continuing to support pronghorn radiotelemetry (if animals are again, radio collared); 11) implementing erosion control measures utilizing a hydrologist/sedimentologist; 12) maintaining and expanding a non-native species removal program including removal of bufflegrass and Sahara mustard; 13)

providing an annual report of pronghorn conservation efforts; and 14) contributing to the 51 recovery projects identified by the SOPH recovery team (Appendix 1 of the 2001 opinion) within National Park Service regulations, either by providing in-kind contributions or by commitment of funds. Consequently, we did not anticipate any incidental take of SOPH as a result of the proposed action. A number of conservation recommendations were included in the opinion.

The November 16, 2001, opinion was remanded for further revision to us by court order, dated January 7, 2003. The April 7, 2003, opinion came to the same conclusion on the pronghorn as the November 2001, opinion (i.e., the proposed action was not likely to jeopardize the continued existence of the pronghorn, and no incidental take of pronghorn was anticipated). Organ Pipe Cactus NM made some changes in the conservation measures after finalization of the opinion. An addendum to the opinion was issued by this office on June 11, 2003, clarifying the changes and stating that they did not alter our previous findings in the April 7, 2003, opinion.

#### Luke Air Force Base Use of Ground-Surface and Airspace for Military Training on the BMGR

The biological opinion (consultation number 02-21-96-F-0094), issued August 27, 1997, addressed military use of the airspace above and the ground space on BMGR-East by Luke Air Force Base. At the time of the consultation, about two-thirds of the BMGR was located on lands managed by the DoD and BLM, with the remaining third located within Cabeza Prieta NWR. Approximately 5 percent (7.6 percent, if not including Cabeza Prieta NWR) of the range had been impacted by military activities. Military activities within the area of overlap with the Cabeza Prieta NWR were limited to use of airspace and operation of four Air Combat Maneuvering Instrumentation sites. Military activities occurring within BMGR-East were managed by Luke Air Force Base and include: airspace use, four manned air-to-ground ranges, three tactical air-to-ground target areas, four auxiliary airfields, Stoval Airfield, and explosive ordnance disposal/burn areas. Primary potential effects of the action included habitat loss due to ground-based activities, harassment and possible mortality of pronghorn at target areas, and disturbance of pronghorn due to military overflights.

We determined that the proposed action was not likely to jeopardize the continued existence of the pronghorn. During each 10-year period of the project, take was anticipated in the form of harassment that was likely to injure up to two pronghorn and in the form of death of at least one pronghorn. The following reasonable and prudent measures were provided to minimize take: 1) minimize impacts of activities on pronghorn; 2) minimize habitat loss, degradation, and fragmentation of pronghorn habitat; 3) monitor and study reactions of pronghorn on the BMGR to military activities; and 4) determine the level of incidental take that results from the project. Three conservation recommendations were provided in the opinion.

Implementation of the reasonable and prudent measures have been documented in their annual reports. We are not aware of any take of pronghorn confirmed attributable to Luke Air Force Base use of the ground-surface and airspace on the BMGR. A pronghorn found dead near a target may have been strafed, but was just as likely to have died from other causes (see "Effects of the Proposed Action" herein for a full discussion of this incident).

The 1997 biological opinion was remanded to us by the Court on February 12, 2001. During the development of this revised opinion, Luke Air Force Base made substantial commitments to minimize the effects of their activities on the SOPH, and additionally committed to implementing a variety of recovery projects recommended by the SOPH Recovery Team. A total of 12 conservation measures were added to the proposed action. In a November 16, 2001, biological opinion, we concluded that the proposed action, including conservation measures, is not likely to jeopardize the continued existence of the SOPH. We further anticipated that no more than three SOPH would be incidentally taken as a result of the proposed action. The incidental take was expected to be one pronghorn in the form of death and two pronghorn in the form of harassment. The incidental take provision will be reviewed concurrent with subsequent reviews of the BMGR INRMP, which will occur every five years. To minimize impacts to SOPH, we provided the following reasonable and prudent measure: Luke Air Force Base shall expand efforts to monitor SOPH on the tactical ranges to minimize the likelihood of adverse impacts to the pronghorn from military training exercises. Additionally, several conservation recommendations were suggested..

In the November 16, 2001, biological opinion, one term and condition was provided to implement the reasonable and prudent measure described above. Luke Air Force Base has since completed this term and condition by updating the range operating instructions to reflect the conservation measures in the proposed action. Luke Air Force Base also continues to support the recovery of the SOPH through the biological monitoring contract and management of their previously obligated funds. Also in the opinion, we discussed a number of conservation measures that Luke Air Force Base agreed to add to their proposed action. During FY 2002, Luke Air Force Base requested over \$300K for SOPH projects and actually received \$151K. In addition, Luke AFB assisted SOPH recovery in other ways that are hard to quantify such as the roadside watering. In FY03, Luke AFB requested over \$400K for SOPH projects and so far it has assurances for \$203K for SOPH projects.

The opinion was remanded again in 2003 with the ARNG and the MCAS-Yuma opinions. In the August 6, 2003, opinion, we also found that the proposed action was not likely to jeopardize the continued existence of the SOPH. No incidental take was anticipated due to the low numbers of pronghorn in the U.S. sub-population. Luke Air Force Base recommitted to the conservation measures agreed to in the November 16, 2001, opinion. A number of conservation recommendations were included in the opinion.

#### Western Army National Guard Aviation Training Site Expansion Project

The non-jeopardy biological opinion for WAATS (consultation number 02-21-92-F-0227) was issued on September 19, 1997. The purpose of WAATS is to provide a highly specialized environment to train ARNG personnel in directed individual aviator qualification training in attack helicopters. The WAATS expansion project includes: 1) expansion of the existing Tactical Flight Training Area, which includes establishing four Level III touchdown sites, 2) development of the Master Construction Plan at the Silver Bell Army Heliport, and 3)

establishment of a helicopter aerial gunnery range for use by the ARNG on East TAC of the BMGR. East TAC is outside the current range of the pronghorn.

This 1997 biological opinion did not address the pronghorn, but, in the Court's opinion, should have and was therefore remanded by the Court. Per the final EIS for WAATS, ARNG use of East TAC did not cause existing training to shift to North or South TACs because Luke Air Force Base eliminated F-15E training at BMGR, concentrating on F-16 air-to-air and air-to-ground training. Therefore, the EIS did not consider impacts to the pronghorn and none were anticipated. All activities that are part of the proposed action occur outside the current range of the pronghorn, with the exception of training at North TAC. Training at North TAC only occurs when East TAC is closed for annual maintenance and EOD clearances (4-6 weeks each year). Effects to pronghorn at North TAC are minimized by monitoring protocols established by Luke Air Force Base. Training at East TAC could preclude recovery of historical habitat if the many other barriers that prevent pronghorn use of East TAC were removed.

The final remanded biological opinion, issued November 16, 2001, found that the proposed action was not likely to jeopardize the continued existence of the SOPH. No incidental take was anticipated. The proposed action included eight conservation measures aimed at the reduction of adverse effects to SOPH and its habitat. The proposed measures minimized, but did not eliminate, habitat disturbance from the ARNG that would occur on North TAC. The WAATS opinion was remanded by the court in 2003 with this opinion and the MCAS-Yuma opinion. The August 6, 2003, opinion also found that the proposed action was not likely to jeopardize the continued existence of the pronghorn. No incidental take was anticipated. ARNG included the following conservation measures as part of their proposed action: 1) they proposed to study the effects of low-level helicopter flights on a surrogate pronghorn population at Camp Navajo, and 2) they committed to funding up to five percent of emergency recovery actions on the BMGR.

#### **F. Summary of Activities Affecting Sonoran Pronghorn in the Action Area**

Historically, livestock grazing, hunting or poaching, and development along the Gila River and Rio Sonoyta were all probably important factors in the well-documented SOPH range reduction and apparent population decline that occurred early in the 20<sup>th</sup> century. Historical accounts and population estimates suggest pronghorn were never abundant in the 20<sup>th</sup> century, but recently, the estimated size of the population in the action area declined from 179 (1992) to 21 (December 2002). At 21, genetic diversity is expected to erode, and the sub-population is in imminent danger of extirpation due to human-caused impacts, or natural processes, such as predation or continued drought. Although the proximate cause of the decline during 2002 was drought, human activities limit habitat use options by pronghorn and increase the effects of drought on the sub-population. The U.S. pronghorn sub-population is isolated from other sub-populations in Sonora by a highway and the U.S./Mexico boundary fence, and access to the greenbelts of the Gila River and Rio Sonoyta, which likely were important sources of water and forage during drought periods, has been severed.

Within its remaining range, the pronghorn is subjected to a variety of human activities that disturb the pronghorn and its habitat, including military training, increasing recreational

activities, grazing, increasing presence of undocumented immigrants and smugglers, and in response, increased law enforcement activities. MCAS-Yuma (2001) quantified the extent of the current pronghorn range that is affected by various activities and found the following: recreation covers 69.6 percent of the range, military training on North and South TACs covers 9.8 percent, active air-to-air firing range covers 5.8 percent, proposed EOD five-year clearance areas at North and South TACs and Manned Range 1 cover 1.0 percent, and MCAS-Yuma proposed ground support areas and zones cover 0.29 percent. In addition, livestock grazing occurs over 5.6 percent of the pronghorn's current range (Organ Pipe Cactus NM 2001, Bright *et al.* 2001); a total of 860 miles of roads occur in the current range (MCAS-Yuma 2001)(2,222 miles of roads exist within the BMGR, of which 650 miles are in current SOPH habitat (MCAS Yuma 2003), and foot and vehicle traffic by undocumented immigrants and smugglers occurs at an increasing frequency throughout the area. Organ Pipe Cactus NM (2001) identified 169 human activities in the range of the pronghorn, of which 112 were adverse, 27 were beneficial, 26 had both adverse and beneficial effects, and 4 had unknown effects. Organ Pipe Cactus NM (2001) concluded that in regard to the pronghorn, "while many projects have negligible impacts on their own, the sheer number of these actions is likely to have major adverse impacts in aggregate."

The current range of the pronghorn in the U.S. is almost entirely comprised of lands under Federal jurisdiction; thus authorized activities that currently affect the pronghorn in the action area are almost all Federal actions. However, illegal, unauthorized foot traffic and off-road vehicle activity have been and continue to be significant non-Federal threats to the pronghorn and its habitat. Prior to November 2001, in seven of 12 biological opinions issued by FWS that analyzed impacts to the pronghorn, we anticipated that take would occur. In total, we anticipated take of five pronghorn in the form of direct mortality every 10-15 years, and an undetermined amount of take in the form of harassment. Given the small and declining population of pronghorn in the U.S. at the time the opinions were written, take at the levels anticipated in the biological opinions would constitute a substantial impact to the current population.

Changes made in the remanded biological opinions in 2001 and 2003, plus the findings in other recent opinions, reduced the amount or extent of incidental take anticipated to occur from Federal actions. In the November 16, 2001, opinion, we found that take would occur in 5 of 13 (the original 12 opinions plus the ARNG opinion that now considers effects on the pronghorn) biological opinions issued up to that point for the SOPH. We now only anticipate take of pronghorn in three opinions: 1) Border Patrol activities in the Yuma Sector, for which incidental take of one pronghorn in the form of harassment was anticipated in 10 years, 2) the Lower Gila South Resource Management Plan and Amendment, in which an undetermined number of pronghorn were anticipated to be taken, and 3) Luke Air Force Base F-15E Beddown Project. However, we believe that conservation measures agreed to by BLM in the 2002 Ajo allotment grazing opinion largely minimizes or eliminates incidental take resulting from the Lower Gila South Resource Management Plan and Amendment. The Luke Air Force Base's F-15 Beddown Project is subsumed into Luke's August 6, 2003, opinion, in which no take is anticipated. This amount of take is much less than that anticipated in 2001 because we have worked together with the Federal action agencies to minimize the effects of ongoing and proposed activities on the SOPH. In addition, with about 21 animals in the U.S. sub-population, the likelihood of take due to Yuma Sector Border Patrol or BLM activities is now much less than we had anticipated when

those opinions were written, because the pronghorn population is much smaller, greatly reducing the likelihood of interactions between pronghorn and these Federal activities (although the effect of any take on the viability of the U.S. sub-population is now much greater, due to small population size). With the exception of likely capture-related deaths during telemetry studies, we are unaware of any confirmed incidental take resulting from the Federal actions described here. Recently undertaken emergency conservation activities conducted by Cabeza Prieta NWR and AGFD, after consultation with the Service, include emergency water tanks, forage enhancement plots, and the proposed semi-captive breeding facility, have not resulted in any known harassment or take of pronghorn.

We believe the aggregate effects of limitations or barriers to movement of pronghorn and continuing stressors, including habitat degradation and disturbance within the pronghorn's current range resulting from a myriad of human activities, exacerbated by periodic dry seasons or years, are responsible for the present precarious status of the SOPH in the action area.

#### **IV. EFFECTS OF THE PROPOSED ACTION**

We now examine the effects of the proposed action in light of the present precarious status of the SOPH to determine whether implementing that action would be reasonably expected, directly or indirectly, to reduce appreciably the likelihood of the survival and recovery of the species. The proposed action includes the proposed conservation measures, which minimize and ameliorate the potential impacts of Luke AFB's activities on the pronghorn.

Effects of ongoing and proposed activities on the SOPH can be segregated into effects of ground-based activities and effects of overflights. Ground-based activities can destroy or degrade forage and cover, and result in behavioral or physiological changes that may be detrimental (Geist 1971, Freddy *et al.* 1986, Workman *et al.* 1992). In response to military overflights, pronghorn may exhibit a startle response or may flush from cover (Krausman *et al.* 2001, Hughes and Smith 1990, Workman *et al.* 1992, Luz and Smith 1976). Pronghorn may alter use of areas to avoid aircraft noise or disturbance (Bleich *et al.* 1990, Krausman *et al.* 1986), or may exhibit other physiological or behavioral responses that could be detrimental (Bowles 1995, Norrix *et al.* 1995, Stockwell and Bateman 1987, Berger *et al.* 1983). In addition, overflights may involve delivery of chaff, flares, rockets, practice or live ordnance, and practice rounds that may affect pronghorn directly or may degrade its habitat. Aircraft crashes and crash rescue or clean up activities for expended ordnance or crash sites may also impact the pronghorn and its habitat.

Our understanding of the effects of the proposed action has not changed dramatically since the November 16, 2001, biological opinion. What has changed is that the U.S. pronghorn sub-population has declined dramatically to roughly 21 animals and a number of crucial emergency recovery actions have been initiated in an attempt to offset the effects of drought and human disturbance, and to hopefully prevent the loss of the U.S. sub-population. The currently very small number of animals in the U.S. population greatly reduces the potential for interaction between pronghorn and military activities. Thus, the likelihood of adverse effects occurring to individuals or the population is much reduced (although any adverse effects that occur would have a proportionally greater impact on the population due to small population size). The

emergency recovery actions are expected to create a less stressful environment, in that forage and water will be available even during drought, and thus wild pronghorn will be better equipped physiologically to withstand stress, such as human disturbance. In time, animals produced in the semi-captive breeding facility will augment the wild population. These factors are discussed in full below.

### Overview - Effects of Ground-Based Activities

Behavioral responses of wild ungulates to human activities range from none to panic flight and abandoning areas of disturbance, while physiological responses may include a variety of effects that can influence survival and reproduction (Geist 1971). deVos (1989) investigated the relationship of telemetered pronghorn localities to the proximity of "concentrated military activities" on the BMGR. Pronghorn tended to be found relatively close to military activities, particularly in areas within 660 feet of military zones, and were found less than expected in areas 5,250 to 21,000 feet from military zones. This occurred despite the fact that many pronghorn were initially captured on Cabeza Prieta NWR and Organ Pipe Cactus NM, at points distant from military activity, and would not be expected to occur near military zones.

Hervert *et al.* (2000) investigated use of military target areas by pronghorn, and found that pronghorn showed a preference for some military target areas. The first 0.6 mile around targets was most preferred by pronghorn, and the authors concluded that pronghorn may be attracted to the airfield and HE Hill on the North TAC. The authors surmised that pronghorn may be attracted to these areas because of available water, forage, and greater visibility. They documented pronghorn drinking from water collected in a bomb crater in this area. The authors found that pronghorn may be attracted to areas with plywood targets, but appeared to avoid metal convoy target areas. Plywood targets were typically located on bajadas, and association with these targets may have been incidental to pronghorn preference for this habitat type.

Krausman *et al.* (2001) investigated effects of military overflights and ground-based activities on the pronghorn at North and South TACs. This is the only comprehensive study of the effects of military activities on the SOPH. The North and South TACs support some of the most intense military use on the BMGR, and, within the current range of the pronghorn, are where most live fire practice and live ordnance delivery occur. The ranges are used heavily by pronghorn; 21 (about 20 percent of the U.S. population) used the two TACs during the study by Krausman *et al.* (2001). Krausman *et al.* (2001) observed 2,128 ground-based events, 443 overflight events, and 594 occurrences of other air stimuli (flares, bombs, smoke) on the BMGR. In response to all stimuli, on days without stimuli, pronghorn foraged more and bedded less than on days with stimuli; the opposite was true for fawns. Krausman *et al.* (2001) only considered a change in behavior to trotting or running in response to stimuli as biologically significant. Eighty-seven (4.1 percent) of the 2,128 events with ground-based stimuli resulted in pronghorn changing their behavior to trotting or running. A total of 866 (41 percent) resulted in some change in behavior. Movements of more than 33 feet associated with ground-based stimuli were observed only once, in which a female moved during multiple stimuli, including two vehicles and military aircraft.

Krausman *et al.* (2001) also monitored noise levels at the BMGR. In regard to all forms of military activities, the authors concluded that: (1) behavioral patterns of pronghorn were similar with and without presence of military stimuli, (2) behavioral patterns of pronghorn exposed to military activity were similar to that of pronghorn not exposed to regular military activity, and (3) auditory characteristics are similar for ungulates that have and have not been exposed to sound pressure levels characteristic of military activity. Military activity was associated with changes in the behavior of pronghorn, but these changes did not likely influence animals in a detrimental manner. The authors found that because of low fawn productivity and recruitment, they could not draw specific conclusions about their behavior in the presence of military activity. Fawns were involved in two of the six instances pronghorn moved more than 33 feet. Fawns appeared to respond to military stimuli as do their mothers, which may be more sensitive to anthropogenic stimuli than other pronghorn.

Any activity that is detrimental to fawns is important to the conservation of the pronghorn because low fawn recruitment appears to limit population size. Hervert *et al.* (2000) investigated fawn survival on the BMGR versus Organ Pipe Cactus NM and Cabeza Prieta NWR, and found no difference in daily mortality rates of fawns between the BMGR and the other two areas. The authors concluded that their data do not support a hypothesis that fawn survival is affected by military training activities. However, military overflights and other ground activities (e.g., recreation, Border Patrol, undocumented immigrants) occur in all three areas to varying degrees; thus it is not possible to evaluate the effects of human activities, including military activities, on fawn survival, or to tease out the effects of ground-based or other types of military activities from other factors that may affect fawn survival.

With the recent decline of the pronghorn population from 99 in 2000 to about 21 animals in 2002, the likelihood that pronghorn will be affected by military activities has declined similarly. Because they are now so scarce on the BMGR, it is now much less likely that a pronghorn will be adversely affected by any one military activity. Pronghorn are probably much more inclined to be adversely affected by ground-based military activities at times when they are stressed by lack of forage and water, such as occurred in 2002 (M. Coffeen, pers. comm. 2003). During these stressful times, running from vehicles or exclusion from foraging areas could contribute to increased mortality or decreased physical condition of individual animals. When forage enhancement projects and water developments are completed, they should provide pronghorn with a buffer against drought and allow them to better survive stressful periods, such as what occurred in 2002. At the same time, if animals are in better condition due to forage enhancement and available water, they will be less affected by human interactions and disturbance.

### Overview - Military Overflights

Overflights by themselves do not cause habitat degradation, but ungulates may respond with increased heart rates and may flee from aircraft in a response similar to ground-based stimuli (Weisenberger *et al.* 1996; Krausman *et al.* 1986, 1998, 2001; Workman *et al.* 1992; Hughes and Smith 1990). Krausman *et al.* (2001) is the only comprehensive evaluation of effects of military activities on the SOPH. The authors documented 149 direct overflights and 263 other overflights

(in which the aircraft passed  $\geq 328$  feet to the side of the animal). Pronghorn changed their behavior 39 and 35 percent of the time during direct and other overflights, respectively. Krausman *et al.* (2001) only considered a change in behavior to trotting or running in response to stimuli as biologically significant. Pronghorn broke into a trot or ran 3.7 percent of the time when exposed to direct overflights, and 1.6 percent of the time during overflights greater than 328 feet to one side of an animal. Pronghorn also ran during a crash of an F-16. Pronghorn trotted or ran in response to flares, bombs, and smoke 1.0 percent of the time. Of the 9 instances where pronghorn changed their behavior to trotting or running, only 2 of these resulted in animals moving more than 33 feet, including a crash of an F-16 crash, and one instance of an overflight at greater than 1,000 feet AGL. In response to all ground and air stimuli, on days without stimuli, pronghorn foraged more and bedded less than on days with stimuli. The opposite was true of fawns. Krausman *et al.* (2001) concluded that military activity was associated with changes in the behavior of pronghorn, but these changes did not likely influence animals in a detrimental manner.

The authors acknowledged that their conclusions were inconclusive in regard to fawns, because of small sample sizes. Other questions remain unanswered as well. The authors observed few “low-level” (less than 1,000 feet AGL) flights; including six direct military overflights, 15 indirect military overflights (where the flight occurred more than 328 feet to the side of a pronghorn), and 14 other low-level direct and indirect overflights; thus the effects of this type of flight were not examined in any depth. Also, the authors did not distinguish between fixed-wing and helicopter flights. However, we suspect the authors observed few helicopter flights, and most overflights were probably fixed-wing aircraft at high elevation: most overflights in R-2301E are by fixed-wing aircraft greater than 1,500 AGL. Unfortunately, we can not discern from Krausman *et al.* (2001) how pronghorn responded to low-level helicopter flights.

Studies of the effects of low-level helicopter flights on other ungulates suggest pronghorn may react more to this type of stimulus than other types of overflights. Helicopters, particularly low-level hovering helicopters, elicit greater responses than fixed-wing aircraft or aircraft flying at higher elevation (Workman *et al.* 1992, Weisenberger *et al.* 1996, Luz and Smith 1976). Pronghorn would be expected to move greater distances and respond for a longer period of time to helicopters than to fixed-wing aircraft. In a study of disturbance effects to pronghorn in Utah, sonic booms and subsonic aircraft flyovers caused elevated heart rates (Workman *et al.* 1992). Pronghorn exhibited the greatest response to a hovering Huey helicopter flown at 500 feet AGL (Workman *et al.* 1992). Luz and Smith (1976) found that pronghorn ran from a low-flying helicopter. Habituation by pronghorn to sonic booms and low-level overflights by F-16 aircraft and Huey helicopters was observed by Workman *et al.* (1992). However, pronghorn did not habituate to low-level hovering by a Huey helicopter. Low-level flyovers by a Cessna 182 elicited apparent habituation in one pronghorn but not another.

Disturbance and flight of ungulates caused by a variety of sources are known to result in numerous physiological effects that can be adverse, including elevated metabolism, lowered body weight, reduced fetus survival, and withdrawal from suitable habitat (Geist 1971). Mule deer disturbed by snowmobiles and humans on foot expended from 0.2 to 5.0 percent of their daily metabolizable energy in each encounter (Freddy *et al.* 1986). Frequent disturbance imposes a

burden on the energy and nutrient supply of animals (Geist 1978), which may be exacerbated in harsh environments such as the BMGR. Repeated stimuli commonly leads to habituation and reduced response (Harris 1943); however, animals should habituate reluctantly to stimuli that pose a threat (MacArthur *et al.* 1979). Despite these findings, overflights of bighorn sheep elicit only minor physiological response and a minor increase in stress (Krausman *et al.* 1998).

The U.S. pronghorn sub-population declined from 99 in 2000 to about 21. As a result, the encounter rate between aircraft and pronghorn will have declined similarly. Although encounters between pronghorn and aircraft are expected to be less than when the population was robust, each animal is more important (because there are fewer of them), making any adverse effects to an individual more important to the survival and recovery of the sub-population.

### Effects of Ordnance Delivery

Direct death or injury to pronghorns could occur as a result of ordnance deliveries, other objects falling from aircraft, spent shells, live rounds, or pronghorn stepping on ordnance. Potential impacts of normal ordnance deliveries are limited to manned and tactical ranges except for air-to-air live ammunition (ball only). On manned ranges and most areas of tactical ranges, ordnance is limited to cannon fire and practice bombs and rockets. High explosive delivery is limited to HE Hills, one of which occurs on each of the tactical ranges. Live Maverick missiles are used on one target near the southern border of North TAC and one target in East TAC. Numerous targets throughout the ranges also receive various degrees of strafing.

East TAC and Manned Ranges 2, 3, and 4 are outside the known current range of SOPH based on telemetry data collected from 1994 through 2000 (Figure 3). Based on these data, a few pronghorn have occurred near Manned Range 1. Therefore, pronghorn appear to be most at risk of death or injury from ordnance from live fire air-to-air training and from air-to-ground training on South TAC, North TAC, Manned Range 1, and the Air-to-Air Live Fire Areas. Luke AFB also monitors Manned Range 1 during ordnance delivery there. Personnel stationed in towers scan the downrange area and around the conventional circles before commencing daily operations. Activities at Manned Range 1 are restricted in accordance with RMO OI 1.1 if SOPH are present.

The likelihood of practice bombs or inert ordnance affecting pronghorn is remote. Such ordnance or pieces thereof would have to fall on or otherwise strike an animal to kill or injure it. Of greater concern are live bombs and strafing or cannon fire. In regard to high explosive ordnance delivery (but not strafing or practice bombs), Luke Air Force base has developed operating instructions for the pronghorn on North and South TACs (Appendix 1). These instructions are implemented during any high explosive delivery of ordnance. The instructions require at least two monitors per tactical range during the daylight hours. The ranges are monitored visually and by telemetry daily (for animals with transmitters) for two hours before delivery begins. If there is a break in ordnance delivery of more than two hours, additional monitoring occurs. If a pronghorn is sighted, no strafing or training ordnance deliveries are made within 1.2 miles and no live ordnance is delivered within 3.1 miles of the pronghorn. No monitors are present at night, but live deliveries are only allowed if there is not a two hour or

greater gap between ordnance deliveries and afternoon monitoring cannot be completed prior to 30 minutes after sunset or the end of civil twilight, whichever is earlier. The assumption is that activity at the targets will discourage pronghorn from moving onto targets into harm's way. However, if there is a break in the activity of more than 2 hours, animals may have moved into harm's way, requiring additional monitoring. Luke AFB has also committed to monitoring Manned Range 1 during ordnance delivery there (personnel stationed at towers at Manned Range 1 will be trained to look for and identify pronghorn and will halt activities if pronghorn are at risk).

No mortality or injury of pronghorn as a result of ordnance delivery or unexploded ordnance has been documented. However, on July 19, 1999, remains of a pronghorn were found at about 0.6 miles from a strafing target at the North TAC. There was evidence of bullet impact areas near the pronghorn (M. Coffeen, Service, pers. comm. 2001), despite the distance from the target. The carcass was sent to the Service's National Wildlife Health Center (NWHC) for necropsy. The lab reported that no lead residue and no metal fragments were found in the remains (Lynn Creekmore, NWHC, pers. comm. 1999). The animal, although probably dead only a week before it was found, had already been heavily scavenged, which made it impossible to determine cause of death. This animal may have been killed by strafing, but could have died from other causes, as well. Male pronghorn had been observed sparring for several days before the male pronghorn remains were found (B. Wirt, Luke AFB, pers. comm. 2001). The animal may have died during combat with another animal. Nonetheless, pronghorn in and near target areas are at risk of death or injury. Pronghorn commonly use the North and South TACs, and are attracted to water and, during favorable growing conditions, ephemeral forage (Hervert *et al.* 2000); thus considerable opportunity exists for interaction between pronghorn and military activities in these areas. During 374 hours of observing pronghorn on the North and South TACs, Krausman *et al.* (2001) noted 594 instances of flares, bombs, smoke, and strafing. Although we do not know what percentage of these instances were bombs or strafing, no injury or mortality of pronghorn were recorded.

North and South TAC are not monitored on days that only strafing is scheduled. Strafing in the absence of monitoring occurs on up to 40-50 days a year (D. Garcia, Luke AFB, pers. comm. 2001). Most strafing is high angle strafe in which little or no ricochet or skip is expected. However, pronghorn that may wander onto strafing targets or other areas where bullets land could be killed or injured.

#### Ordnance, Flare, and Chaff Delivery; Strafing, and Laser Targeting

The effects of chaff and flares were evaluated by U.S. Air Force Air Combat Command (1997). The report concluded that chaff is unlikely to have any adverse effects to terrestrial wildlife, although adverse effects were possible in aquatic systems. If chaff fell in water, the effects of pronghorn using that water are unknown. A study by MCAS-Yuma is currently underway to evaluate the effects of chaff-contaminated water sources on pronghorn at the BMGR. If adverse effects to pronghorn are identified, the report will include recommendations for reducing or eliminating such effects. The primary effect of flares is increased incidence of fire. On the BMGR, fuel loads are very low, making the likelihood of a flare-caused fire very low. However,

in some years with abundant ephemeral vegetation, particularly in disturbed areas where nonnative annual plants are abundant, flares could ignite fires. If ignited, fires would not likely carry far due to discontinuity of fuels.

The three TACs located in BMGR-East, are designated for use by combat lasers mounted on aircraft. Only the North and South TACs are within the current pronghorn range. The lasers may cause eye injury or blindness if an observer looks directly into the laser light. The two TACs cover a large area, but the laser-focused hazard area is greater than the general hazard area in the TACs. And, if pronghorn were present in this area, potentially an animal in the hazard area could hear an approaching aircraft, look up at the aircraft and be hit by a laser that could injure or blind the animal. The area affected by a laser beam is very narrow and it is unlikely that a pronghorn would be directly in the path of a laser or be injured or blinded. No pronghorn are known to have been affected by laser targeting.

#### Effects of Ground-based Activities

Potential injury or death to pronghorn from collisions with ground vehicles involved in military activities are unlikely because the majority of roads on the BMGR are unimproved and vehicle speeds are low. The only roads where collisions appear to be even remotely possible are those out to Manned Range 1, which is staffed on weekdays throughout the year except for times when the range is closed. Manned Range 1 is within the pronghorns' current range. The posted speed limit on the access road is 35 mph and the openness of the terrain makes a collision highly unlikely.

As discussed in the overview, vehicles may elicit a flight response in pronghorn, with possible associated physiological effects that can be adverse, including elevated metabolism, lowered body weight, reduced fetus survival, and withdrawal from suitable habitat (Geist 1971). However, Krausman *et al.* (2001) found that military activity, including vehicle use, was associated with changes in the behavior of pronghorn, but these changes did not likely influence animals in a detrimental manner. Presence of troops or maintenance workers at areas of ground activities is transitory within the current range of the pronghorn; however, when people are present on the ground, they are likely to exclude use by pronghorn of localized areas. This is likely to have the greatest effects on pronghorn during the critical portion of the fawning season, from March 15 to July 15, or during times of drought when pronghorn are in poor physical condition. If winter and spring rains have been spatially concentrated in portions of Childs or Growler valleys subject to military activities, pronghorn could be excluded from important foraging areas. In years with good winter/spring rainfall and abundant forage when pronghorn are in good physical condition, presence of troops and other personnel probably have minimal effects to pronghorn. The current small number of pronghorn in the U.S. sub-population much reduces the likelihood of interactions between pronghorn and military activities. Forage enhancement projects and water developments will improve the ability of SOPH to survive drought periods and decrease the effects of human disturbance on the sub-population during these otherwise stressful periods.

### Effects of Aircraft Crashes and Crash Rescue and Clean Up

Aircraft crash infrequently in currently occupied pronghorn habitat on the BMGR. Krausman *et al.* (2001) witnessed pronghorn response to a crash of an F-16. On February 16, 2000, five pronghorn were observed running at the moment of impact of an F-16 on the South TAC. The pronghorn were not visible before the crash, but ran more than 30 feet after the event. Pronghorn could potentially be hit by an aircraft or pieces of an aircraft, but this is highly unlikely. The noise and visual stimuli of a crashing aircraft is likely to be disturbing to pronghorn, and as witnessed by Krausman *et al.* (2001), they may flush or leave the area. Rescue operations and crash cleanup, involving emergency vehicles, trucks, and foot traffic are also expected to result in a flush response or pronghorn leaving the area. If natural fuels, such as dried annual plants, occur in abundance at the point of impact, a fire may result. However, because of generally low fuel loads in the desert scrub of the BMGR, a wildfire is not likely to carry far.

### Habitat Destruction or Modification at Tactical Ranges, Manned Range 1, and Air-to-Air Live Fire Area

Luke AFB estimated the area within their target ranges affected by various impacts and also estimated the area of the U.S. SOPH range overlapped by these areas of impact. Category 1 includes areas regularly impacted by air-to-ground ordnance deliveries within manned and tactical target ranges. In these areas, habitat disturbance is the greatest and ranges from moderate to, at such sites as HE Hills, complete disturbance of soils and lack of vegetation. A total of 5,741 acres within South TAC, North TAC, and Manned Range 1 are affected within this category. Category 2 includes areas subject to regular range munitions clean up. The EOD clearances occur yearly on North and South TAC, and every two and one half months on Manned Range 1. During range clearances, large six-wheeled drive trucks are driven across the desert at intervals ranging from 50 feet to 150 yards searching for ordnance items. Clean up activities result in vehicle tracks and other disturbance associated with removal/disposal of ordnance, crushing or destruction of vegetation, and disturbance of soils. However, these areas are not as disturbed as Category 1 areas. A total of 8,539 acres within South TAC, North TAC, and Manned Range 1 are affected within this category. Category 3 includes areas subject to 5-year range munitions clearances. A total of 74,098 acres within South TAC, North TAC, and Manned Range 1 are affected within this category. Similar types of activities and disturbance occur in Category 3 areas, but are less frequent and are less apparent than in Category 2 areas. Category 4 includes all roads in the eastern segment of the BMGR for which data were available. Road widths were liberally assumed to average 30 feet. A rough estimate was made due to the lack of current data. A total of 1,915 acres within South TAC, North TAC, and Manned Range 1 are impacted within this category. Roads are used for traveling into Manned Range 1 towers, access to ranges for operation of electronic warfare equipment, maintenance, resource management, and EOD activities; and occasional use by ground, forward air controllers, security guards, contractors, and RMO staff. Ground spotters use existing roads to access areas for ground-based coordination with aircraft for targeting on an occasional basis. No other land-based training

regularly occur on the BMGR-E of the BMGR. A total of 187,944 acres of the Air-to-Air Live Fire Areas are subject to potential effects from rare events of live air-to-air fire, and falling spent shells.

To summarize the sweeps and clearances by areas:

-Manned Range 1 clearance is defined as follows: 100 meters every 75 use days (approximately every two and one half months); 300 meters annually; 1000 meters (to less than five items per acre) every five years.

-North TAC and South TAC are cleared annually. The one year sweep area (Category 2) extends 300 meters from targets and includes 16,122 acres.

-NTAC and STAC sweep areas are increased every five years to clear a larger area. The five year sweep area (Category 3 covers 1,000 meters [or less than five units per acre]) from targets and includes 21,499 acres.

Disturbance of habitat due to military activities probably has mixed effects on pronghorn. In extremely affected areas, such as in active targets in Category 1, perennial forage may be absent or scarce. Activities in other Category areas may also remove or damage perennial forage resources. However, as discussed in the overview, pronghorn are attracted to these disturbed areas because of available water, annual forage - which may grow in greater abundance in these areas, and greater visibility. Pronghorn have been observed drinking from water collected in a bomb crater (Hervert *et al.* 2000).

#### Effects of Noise and Aircraft Overflights

SOPH may be affected by noise from and visual impacts of aircraft overflights. Pronghorn have been exposed to aircraft overflights on BMGR since 1941. Pronghorn are exposed to military aircraft overflights on most of the eastern segment of BMGR. However, most aircraft maintain a minimum altitude of 500 feet, with more than 90 percent of flights over 800 feet AGL. Less than 12 percent of all flights over BMGR are supersonic and all supersonic flights occur at altitudes greater than 5,000 feet. Over Cabeza Prieta NWR, USAF aircraft maintain a minimum altitude of 1,500 feet with greater than 90 percent of flights occurring over 5,000 feet, except in MTRs, where aircraft may operate down to 500 feet AGL. Most helicopter use of the BMGR-E is in R-2304, which is outside the current range of SOPH. Helicopter flights over all of R-2301E, much of which overlies pronghorn range, were limited to 232 sorties in 72 flights in fiscal year 1995. Harris Environmental Group (2002) monitored the TACs for 248 days between January 1, 2002 and December 31, 2002. During that time HE hills missions on North TAC and South TAC had a seven percent cancellation rate during the reporting period because of the presence of pronghorns. In 2003 with the current low population levels, the mission cancellation rate is even lower.

As discussed in the overview, Krausman *et al.* (2001) observed few biologically significant responses of pronghorn to overflights. Pronghorn broke into a trot or ran 3.7 percent of the time when exposed to direct overflights, and 1.6 percent of the time during overflights greater than

328 feet to one side of an animal. Krausman *et al.* (2001) did not distinguish between fixed wing and helicopter flights; however, because most overflights in R-2301E are by fixed wing aircraft at >1,500 feet AGL, the data collected by them probably reflect responses to high-level jets.

Low-level helicopter flights are most likely to elicit biologically significant responses from pronghorn (see the overview, Workman *et al.* 1992, Weisenberger *et al.* 1996, Luz and Smith 1976). Luke AFB does not conduct helicopter flights, but authorizes such use of the tactical ranges by the Marine Corps and ARNG. Helicopter use may result in flight response by pronghorn away from low-level helicopter flight routes. Disturbance and flight of pronghorn may result in numerous physiological effects that can be adverse, including elevated metabolism, lowered body weight, reduced fetus survival, and withdrawal from suitable habitat (Geist 1971). More information on the effects of helicopter use by the Marine Corps and ARNG can be found in the revised biological opinions for the activities of those agencies on the BMGR.

In addition to noise and visual impacts from aircraft overflights, other military activities on the BMGR-E that may adversely affect pronghorn behavior include noise from practice and live ordnance, use of air-dropped flares during night training, and ground-based human activity on manned and tactical ranges. Krausman *et al.* (2001) monitored noise levels at the BMGR. The loudest sound recorded was near HE Hill on the North TAC in 1998 that measured 121.8 decibels and had a duration of 59.1 seconds. Thirty-five of 737 hours monitored at this site had average sound levels of more than 70 decibels. At another site, five miles from the first site, noise levels were lower, and the maximum noise was 119.3 decibels. Krausman *et al.* 2001 did not specifically evaluate effects of noise on pronghorn at the BMGR. However, biologically significant responses to bombs, flares, and smoke were recorded infrequently (1.0 percent).

Krausman *et al.* (2001) found that because of low fawn productivity and recruitment, they could not draw specific conclusions about their behavior in the presence of military activity. Fawns appeared to respond to military stimuli as do their mothers, which may be more sensitive to anthropogenic stimuli than other pronghorn. The endangered and declining status of the pronghorn, the apparent heightened sensitivity of fawns and their mothers to disturbance, and the critical nature of fawn survival to population persistence suggests disturbance from aircraft overflights and other sources of noise or visual stimuli should be minimized during critical fawning periods (March 15-July 15), or during times of drought when pronghorn are in poor physical condition. If winter and spring rains have been spatially concentrated in portions of the Childs or Granite Valleys subject to military activities, pronghorn could be excluded from important foraging areas. In years with good winter/spring rainfall and abundant forage when pronghorn are in good physical condition, presence of troops or other personnel probably have minimal effects to pronghorn. The current small number of pronghorn in the U.S. sub-population much reduces the likelihood of interactions between pronghorn and military activities. Forage enhancement projects and water developments will improve the ability of SOPH to survive drought periods and decrease the effects of human disturbance on the sub-population during these otherwise stressful periods.

## **Recreation, Natural Resources, and Cultural Resources Management**

Recreational users of the BMGR-East can affect pronghorn in ways similar to military activities. Vehicles, campers, discharge of firearms by hunters and recreational shooters, hikers, and other visitors to the range can all cause pronghorn to flee or avoid areas of human use, such as campsites. The level of visitor use has grown in recent years and now averages about 8,000 permits annually for the BMGR. This use is concentrated in the fall, winter, and early spring months, particularly on the weekends. MCAS Yuma (2003) did not provide information on the distribution of visitation, but at least some of that use occurs outside the current range of the pronghorn in Area B, east of SR 85. The current range of the pronghorn on the BMGR is closed to the public from March 15 to July 15, the key period for fawning and fawn survival. Few people visit the BMGR from July 15 to the end of September due to extreme heat. At 8,000 permits on the BMGR annually, on any day in the cooler months many parties of recreationists are likely to be present on the range. If we assume most use occurs from October 1 to March 15, then 45-50 permits are issued on average for each day during that period. Several hundred permits may be issued on holiday weekends. Although rates of visitation are, at times, high, visitors are present at a time when forage conditions are likely to be good, due to winter precipitation, and temperatures are cool. Pronghorn in the cooler months are typically not stressed and are usually in good condition. Only two small areas on BMGR-E are accessible to the public which are within current SOPH habitat (that part of Management Unit 6 east of SR-85 and the area on the western edge of Management Unit 4 in Mohawk Mountains.). Flight from vehicles, hikers, shooting and other human disturbance are unlikely to have significant deleterious effects at that time of year.

Natural and cultural resources management require range access for inventory, monitoring, and research by wildlife biologists, botanists, cultural resources specialists, and others. As with other human activities, pronghorn may flee from vehicles and people on foot, and activities may temporarily displace pronghorn from foraging or fawning areas. However, biologists and cultural resource specialists attempt to avoid areas of pronghorn use, and presence of these resource specialists in pronghorn habitat is a relatively rare event compared to recreationists, military activities, U.S. Border Patrol, and other human activities.

The INRMP and ICRMP will further define limitations and opportunities for recreationists at BMGR, and management for wildlife, including pronghorn. Key to protecting pronghorn from recreational activities will be limiting vehicular access in key foraging and fawning areas, and maintaining the current seasonal restrictions on special use permits. Driving in washes can be especially deleterious because pronghorn often bed down in these areas and are flushed out when vehicles pass by. The INRMP (which will include implementation of the ICRMP) will be the subject of future consultation.

### Conservation Measures

Luke AFB has made substantial commitments to minimize the effects of their activities on the SOPH, and has additionally committed to implementing a variety of recovery projects recommended by the SOPH Recovery Team. Recent changes in the EOD schedule have changed

EOD activities on North and South TAC to outside of the critical period for fawns and their mothers. Sensitive species' briefings, limiting vehicles to designated routes, low speed limits, limiting surface disturbance, monitoring of tactical ranges and closing those ranges if pronghorn are at risk, and other commitments greatly reduce the effects of the proposed action on the SOPH.

The proposed measures minimize, but do not eliminate, habitat disturbance associated with use of tactical ranges, Manned Range 1, EOD activities and other ground-based activities; and effects of military overflights and associated activities, of which the most important are effects of low-level helicopter flights authorized by Luke AFB. Monitoring of high-explosive ordnance delivery at the tactical ranges greatly reduces the chances of injury or mortality of pronghorn. However, of concern is strafing that occurs up to 40-50 days per year in the absence of monitoring. Pronghorn could be killed or injured at North or South TAC, and on Manned Range 1 as a result of this activity; although at current population levels, the likelihood of animals being strafed is very low.

## **V. CUMULATIVE EFFECTS**

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Most lands within the current range of the pronghorn are managed by Federal agencies; thus most activities that could potentially affect pronghorn are Federal activities that are subject to the section 7 consultation. The effects of these Federal activities are not considered cumulative effects. Relatively small parcels of private and State lands occur within the currently-occupied range of the pronghorn near Ajo and Why, north of the BMGR from Dateland to Highway 85, and from the Mohawk Mountains to Tacna. State inholdings in the BMGR were recently acquired by the USAF. Continuing rural and agricultural development, recreation, vehicle use, grazing, and other activities on private and State lands adversely affect pronghorn and their habitat. MCAS-Yuma (2001) reports that 2,884 acres have been converted to agriculture near Sentinel and Tacna. These activities on State and private lands and along the Mexican border and the effects of these activities are expected to continue into the foreseeable future. Historical habitat and potential recovery areas currently outside of the current range are also expected to be affected by these same activities on lands in and near the action area in the vicinity of Ajo, Why, and Yuma.

Of particular concern are increasing illegal border crossings by undocumented migrants and smugglers. Deportable migrant apprehensions by Border Patrol agents in the Ajo Station increased steadily from 9,150 in 1996 to 20,340 in 2000. Apprehensions in the BMGR by Border Patrol were 9,500, 11,202, and 8,704 in 1996, 2000, and 2001, respectively (URS Corporation 2003). In 2001, estimates of undocumented migrants traffic reached 1,000 per night in Organ Pipe Cactus NM alone (Organ Pipe Cactus NM 2001). Given these numbers and that Border Patrol apprehends only a fraction of illegal migrants and smugglers, undocumented illegal

traffic through the BMGR probably exceeds recreational use even on the busiest of holiday weekends. Increased presence of Border Patrol in the Douglas, Arizona area, and in San Diego (Operation Gatekeeper) and southeastern California, have pushed undocumented migrant and smuggler traffic into remote desert areas, such as Cabeza Prieta NWR, Organ Pipe Cactus NM, and BMGR (Klein 2000). Vehicle barriers and effective patrols in the Algodones Dunes of Imperial County, California are probably responsible for a recent redirection to and increase of illegal vehicle crossings and vehicle abandonment in the BMGR (May 21, 2003, meeting notes of the Barry M. Goldwater Range Executive Council). These illegal crossings and law enforcement response have resulted in route proliferation, off-highway vehicle (OHV) activity, increased human presence in backcountry areas, discarded trash, abandoned vehicles, cutting of firewood, illegal campfires, and increased chance of wildfire. Habitat degradation and disturbance of pronghorn almost certainly results from these illegal activities. We expect these activities to continue; however, some discussions are occurring between Mexican and U.S. officials about the creation of a guest worker program whereby Mexican nationals could legally cross the border to work in the U.S. If such a program was initiated, it might greatly reduce future illegal immigration and law enforcement response, with concomitant reductions in habitat degradation and suspected disturbance of pronghorn.

## VI. CONCLUSION

After reviewing the current status of SOPH, the environmental baseline for the action area, the effects of Luke AFB's proposed action and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the SOPH. No critical habitat has been designated for this species, therefore, none will be affected. In making our determination, we considered the following:

1. As reflected in the Environmental Baseline and cumulative effects sections above, the U.S. sub-population of pronghorn has been and is subjected to a myriad of human activities that have the potential to adversely affect the SOPH and its habitat. Such activities include livestock grazing, recreation, military activities on the BMGR, and an increasing influx of undocumented migrants and smugglers and corresponding response from the U.S. Border Patrol and other law enforcement agencies. Further, the range of the U.S. pronghorn sub-population is limited by highways, fences, canals, and towns that act as physical barriers to pronghorn movement and prevent them from accessing foraging areas and, during drought, greenbelts such as the Gila River and Rio Sonoyta.
2. The status of two of the three sub-populations of SOPH are in decline and in serious danger of extirpation. The U.S. sub-population is estimated at 21 animals, while the Pinacate sub-population is estimated at 25. At these levels, population viability is low and genetic variability is expected to erode. The southernmost sub-population, southeast of Mexico Highway 8, also declined from 2000-2002, but at an estimated 255 animals, it is not in immediate danger of extirpation.
3. While drought was the proximate cause of the SOPH's decline during 2002, the high level of human activities and disturbance on the U.S. side has exacerbated the effects of

- drought. Increasing undocumented migrant traffic, smuggling, and associated law enforcement response are of particular concern.
4. Emergency recovery actions have been initiated in an attempt to reverse the recent decline in the status of the U.S. sub-population. A semi-captive breeding facility is expected to be completed this year in which pronghorn will be housed in a predator-free environment with abundant forage and water. It is hoped that pronghorn will successfully reproduce in the facility and provide animals to augment the wild population. A forage enhancement plot will be installed in association with the facility, and another in the same area is currently in operation. These will provide green forage for pronghorn during times of drought. Water sources are also being developed. These water sources and forage enhancement plots are expected to buffer the effects of drought, which have been the proximate cause of recent population declines. Luke AFB has fully funded two forage enhancement plots and provided manpower to assist in bringing multiple forage plots on line. Luke AFB has also contributed funds for construction, operation and maintenance of the planned semi-captive breeding facility, as well as funds to import SOPH from Mexico.
  5. Only minor amounts of SOPH habitat are expected to be lost or degraded.
  6. Luke AFB has increased its monitoring efforts on North and South TACs to minimize adverse effects to pronghorn from bombing and strafing.
  7. Luke AFB ground activities and helicopter operations at the TACs authorized by Luke AFB that can adversely affect pronghorn will be monitored by the biological monitors to ensure no adverse effects occur.
  8. Luke AFB will continue to update operational instruction 1.1 to ensure it effectively protects the pronghorn.
  9. Luke AFB will close roads under the INRMP process and review these closures every five years.
  10. Luke AFB will continue to contribute to recovery actions for the pronghorn.

In summary, the status of the listed SOPH rangewide is poor, with sub-populations in the Pinacate Region of Mexico and in the United States facing possible extirpation. Fragmentation of populations, loss of historical habitats, disease, and human-caused degradation of remaining habitats; and disturbance of pronghorn are the most important causes of poor rangewide status. As discussed in the “Environmental Baseline” section above, within the action area, we believe the aggregate effects of limitations or barriers to movement of pronghorn and continuing stressors, including habitat degradation and disturbance within the pronghorn’s current range resulting from a myriad of human activities and disease exposure, combined with periodic dry

seasons or years, are responsible for the present precarious status of the SOPH in the U.S. The dramatic impacts to the U.S. sub-population of pronghorn resulting from the 2002 drought have undoubtedly been exacerbated by the human-induced degradation of their habitat and human-created barriers, which restrict their movement. Cumulative effects, particularly illegal crossings of the border and travel through pronghorn habitat by smugglers and undocumented immigrants, add additional stressors to pronghorn populations.

At the current time the environmental baseline with respect to the SOPH is declining. However, the high fawn-to-doe ratio experienced in 2001 when rainfall was abundant and timed well for forage production provides evidence of the reversible nature of the current decline. The potential for the U.S. sub-population to rebound will be enhanced by the emergency recovery actions, such as forage enhancement plots, water developments, and the semi-captive breeding facility. When added to the status of the species, the environmental baseline, and cumulative effects, the effects of Luke AFB's proposed action, which includes significant conservation measures, do not reduce appreciably the likelihood of survival and recovery of the SOPH in the wild. As proposed, Luke AFB's actions affect only a small portion of suitable pronghorn habitat within the current range of the U.S. sub-population. Under normal circumstances, the likelihood for interaction between the military activities and pronghorn are mitigated by the duration and frequency of the activities and the conservation measures that continue to be undertaken by Luke AFB. The interactions, however, are currently less likely to occur because of the very small sub-population remaining in the United States. Moreover, water development and forage enhancement plots should make the pronghorn less susceptible to biologically significant threats during drought conditions.

In determining that the proposed action is not likely to jeopardize the continued existence of the pronghorn, we assume that the conservation measures will be implemented fully and promptly as proposed by Luke AFB, and that take of pronghorn is not reasonably certain to occur. If the emergency recovery actions are not successful, or the number of SOPH increase to the point where the Luke AFB's activities are reasonably certain to result in take of the species, it may be necessary to reinitiate consultation to confirm that the activities are not likely to jeopardize the continued existence of the species.

### **INCIDENTAL TAKE STATEMENT**

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined (50 CFR 17.31) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined (50 CFR 17.31) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA

provided that such taking is in compliance with the terms and conditions of this incidental take statement.

### **Amount or Extent of Take Anticipated**

In the “Effects of the Proposed Action” we have identified several ways in which incidental take may potentially occur, including strafing or ordnance delivery at targets in BMGR-East, collisions with vehicles on roads, and disturbance of pronghorn or exclusion from important foraging or fawning habitat during drought when pronghorn are particularly stressed and in poor condition. Nonetheless, we are not aware that any incidental take of pronghorn has occurred as a result of the activities of the Luke AFB. With only 21 pronghorn in the U.S. sub-population, the likelihood of any one pronghorn being harassed or otherwise taken is greatly reduced compared to the 1990s when the population was over 100, and at most times, well over 100. Also, conservation measures are in place to minimize the likelihood of take from these activities. As a result, we do not believe any incidental take of pronghorn is reasonably certain to occur at current population levels.

If the number of SOPH increases to the point where the Luke AFB’s activities are reasonably certain to result in take of the species, it will be necessary to reinitiate consultation to reevaluate the incidental take statement including the level of take that can be tolerated without reducing appreciably the likelihood of survival and recovery of the SOPH in the wild. Currently, we believe the number of pronghorn that would trigger this reevaluation is 140 free ranging (not in the semi-captive breeding facility) pronghorn (see the November 16, 2001, opinion). Pursuant to 50 CFR 402.16(a), reinitiation would also be required if incidental take occurs and exceeds that anticipated herein or in subsequent reinitiations.

## **CONSERVATION RECOMMENDATIONS**

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends that Luke AFB implement the following:

1. Continue to pursue funding for all research needs that are identified for implementation by USAF in the final revision of the SOPH recovery plan, as well as all research needs that have been concurrently or subsequently identified by the SOPH Recovery Team.
2. Conduct and/or fund research cooperatively with the Marine Corps and the U.S. Border Patrol to determine the effects of low level flights by helicopters on free-ranging pronghorn and use the information to evaluate flight ceilings and low-level flight corridors over Cabeza Prieta NWR . The lead agency should provide the Service with the results of any research in a timely manner.

3. Continue to maintain the SOPH GIS database from all historic sightings in USAF files and support an annual program of documenting SOPH sightings by employees and other agencies throughout range.
4. Continue efforts to implement the use of modular targets and electronic scoring systems to reduce the number of strafing targets. Additionally, the USAF should continue to evaluate the development of a sensor training area where pilots can practice delivery of precision- guided munitions on no-drop, electronically scored, targets.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

### **DISPOSITION OF DEAD, SICK, OR INJURED LISTED ANIMALS**

If a dead, injured, or sick individual of a listed species is found by Luke AFB in the action area, initial notification must be made to Service Law Enforcement, Federal Building, Room 105, 26 North McDonald, Mesa, Arizona, 85201 (telephone: 480/835-8289) within one working day of its finding. Additionally, Cabeza Prieta NWR must be contacted at 520/387-6483. These telephone contacts will be documented in telephone logs by the reporting agencies. Written notification must be made within five calendar days and include the date, time, and location of the finding, a photograph of the animal, and any other pertinent information. The notification shall be sent to Law Enforcement with a copy to the Arizona Ecological Services Field Office, 2321 W. Royal Palm Road, Suite 103, Phoenix, AZ 85021. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state possible. If possible, the remains shall be placed with educational or research institutions holding appropriate State and Federal permits. If such institutions are not available, the information noted above shall be obtained and the carcass left in place but protected from predators. Arrangements regarding proper disposition of potential museum specimens shall be made with the institution prior to implementation of the action. Injured pronghorn should be transported to the Phoenix Zoo for treatment and rehabilitation. You should contact us and Kevin Wright (602/914-4373) or Curtis Eng (689-7427), or Kathy Orr (602/576-1696) at the zoo prior to transport.

### **REINITIATION STATEMENT**

This concludes formal consultation on use of BMGR-E by Luke AFB. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; 3) the agency action is subsequently modified in a manner that causes an effect to a listed species or critical habitat not considered in this opinion; or 4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or

extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Thank you for your cooperation and assistance throughout this consultation process. Any questions or comments should be directed to Mike Coffeen (x251) or Jim Rorabaugh (x238) of my staff.

Sincerely,

/s/ Steven L. Spangle  
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)  
Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ  
Regional Solicitor, Department of the Interior, Albuquerque, NM  
Manager, Cabeza Prieta National Wildlife Refuge, Ajo, AZ  
Robert Gulley, Department of Justice, Washington, D.C.  
State Director, Bureau of Land Management, Phoenix, AZ  
Field Office Manager, Yuma Field Office, Bureau of Land Management, Yuma, AZ  
Field Office Manager, Phoenix Field Office, Bureau of Land Management, Phoenix, AZ  
Ron Pearce, Director of Range Management, Marine Corps Air Station, Yuma, AZ  
Park Superintendent, Organ Pipe Cactus National Monument, Ajo, AZ  
Captain William Fay, Arizona Army National Guard, Phoenix, AZ  
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John Kennedy, Arizona Game and Fish Department, Phoenix, AZ  
Larry Voyles, Arizona Game and Fish Department, Yuma, AZ

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Table 1. A summary of population estimates from literature and field surveys for Sonoran pronghorn in the U.S.

Date	Population estimate (95 percent CI <sup>a</sup> )	Source
1925	105	Nelson 1925
1941 <sup>b</sup>	60	Nicol 1941
1957	<1,000	Halloran 1957
1968	50	Monson 1968
1968-1974	50 - 150	Carr 1974
1981	100 - 150	Arizona Game and Fish Department 1981
1984	85 - 100	Arizona Game and Fish Department 1986
1992	179 (145-234)	Bright <i>et al.</i> 1999
1994	282 (205-489)	Bright <i>et al.</i> 1999
1996	130 (114-154)	Bright <i>et al.</i> 1999
1998	142 (125-167)	Bright <i>et al.</i> 1999
2000	99 (69-392)	Bright <i>et al.</i> 2001
2002	21 (18-33)	Bright <i>et al.</i> 2002

<sup>a</sup> Confidence interval; there is only a 5 percent chance that the population total falls outside of this range.

<sup>b</sup> Population estimate for southwestern Arizona, excluding Organ Pipe Cactus National Monument.

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Table 2. Comparison of U.S. Sonoran pronghorn population surveys, 1992-2002.

Date	Pronghorn observed		Population estimates		
	On transect	Total observed	Density estimate using DISTANCE (95 percent CI) <sup>a</sup>	Lincoln-Peterson (95 percent CI)	Sightability model (95 percent CI)
Dec 92	99	121	246 (103-584)	---	179 (145-234)
Mar 94	100	109	184 (100-334)	---	282 (205-489)
Dec 96	71	82 (95 <sup>b</sup> )	216 (82-579)	162 (4-324)	130 (114-154)
Dec 98	74	86 (98 <sup>b</sup> )	---	172 (23-321)	142 (125-167)
Dec 00	67	69 <sup>b</sup>	---	---	99 (69-392)
Dec 02	18	0	---	---	21 (18-33) <sup>c</sup>

<sup>a</sup> Confidence interval; there is only a 5 percent chance that the population total falls outside of this range.

<sup>b</sup> Includes animals missed on survey, but located using radio telemetry.

<sup>c</sup> Jill Bright, Arizona Game and Fish Department, pers. comm. 2003

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Table 3. Comparison of Sonoran pronghorn surveys in Mexico, 1993, 2000, and 2002.

	Total number of pronghorn seen	Sightability model (95 percent CI <sup>a</sup> )
<i>March 1993</i>		
Southeast of Highway 8	163	289 (226-432)
West of Highway 8	51	124 (91-211)
Total	214	414 (317-644)
<i>December 2000</i>		
Southeast of Highway 8	249	311 (261-397)
West of Highway 8	17	34 (27-48)
Total	266	346 (288-445)
<i>December 2002</i>		
Southeast of Highway 8	195	255 <sup>b</sup>
West of Highway 8	19	25 <sup>b</sup>
Total		

<sup>a</sup> Confidence interval; there is only a 5 percent chance that the population total falls outside of this range.

<sup>b</sup> These estimates are tentative and confidence intervals have not yet been generated (Jill Bright, Arizona Game and Fish Department, pers. comm. 2003).

Table 4. Diseases transmissible between cattle and pronghorn.

<u>Actual Documented Disease</u>	<u>Reservoirs/Oddities</u> / <u>Transmission Routes</u>	<u>Clinical Signs</u>	<u>Control</u>	<u>Citation(s)</u>
<b>BACTERIAL DISEASES</b>				
<u>Leptospirosis</u> <i>Leptospira interrogans</i> serovar <i>hardjo</i>	transmitted thru infected urine, fetal tissues or rarely aerosol; organism can live outside host for up to 6 months in soil, water or on vegetation; asymptomatic shedders can transmit the disease over the long-term	fever, blood-tinged urine, jaundice, renal failure, abortion	reduce contact among domestic and wild animals; reduce incidence of stagnant water and moist, warm conditions; control situations where virus can be shed	Merck (1986) Kreplin (2002)  Leighton and Kuiken (2001)
<b>VIRAL DISEASES</b>				
<u>Bluetongue</u> Bluetongue orbivirus (BTV)	vector = infected biting midge <i>Culicoides sonorensis</i> ; BTV also associated with cattle lice <i>Haematopinus eurysternus</i> ; infected blood and semen can also directly transmit disease; highest incidence of disease in July-Sept	fever, inflamed, ulcerated erosion in mouth; lameness; abortion; emaciation; sterility, growth delay, death	reduce vector attraction to fetid water sources; reduce contact, overcrowding and competition, particularly July to September	Howerth, <i>et al.</i> (2001)  World Organization for Animal Health (2002)  Stott (2002)



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<p><u>Parainfluenza</u> Parainfluenza 3 Virus (PI-3V)</p>	<p>aerosol</p>	<p>fever, runny nose, coughing, difficulty breathing, ocular discharge, depression, poor appetite</p>	<p>handle animals with care; provide adequate feed and water; minimize exposure to contributing environmental conditions; avoid overcrowding; reduce stress</p>	<p>Arizona Game and Fish Department, unpubl.data  Pfizer Animal Health (2002)</p>
<p><u>St. Louis Encephalitis</u> St. Louis Encephalitis arbovirus (SLEV)</p>	<p>vectors = mosquitoes; bats may serve as overwintering hosts</p>	<p>meningitis, encephalitis; central nervous system disease; death</p>	<p>mosquito control; surveillance of disease epidemic cycles</p>	<p>Yuill and Seymour (2001)</p>
<p><u>Vesicular Stomatitis</u> Vesicular Stomatitis-New Jersey rhabdovirus (VSNJ)</p>	<p>vector = sand flies; disease of No. Am. horses, cattle, swine; documented in Mexico in pronghorn, bighorn sheep and deer</p>	<p>fever, large fluid- filled blisters on mouth, nose, lips, muzzle, above hoof, teats, loss of appetite, depression, excessive salivation</p>	<p>vector control; separation of affected species of ungulates</p>	<p>Yuill and Seymour, (2001)</p>
<p><u>Malignant Catarrhal Fever</u> Malignant Catarrhal Fever (MCF) gammaherpesvirus</p>	<p>aerosol or contact with nasal or ocular fluids; fecal contamination</p>	<p>Fever, profuse nasal discharge, corneal opacity, swollen lymph nodes, inflamed oral, ocular and nasal mucosas; occasionally central nervous signs with diarrhea, skin lesions and arthritis; high mortality rate</p>	<p>cattle kept separated from potential reservoirs; “stocking of cattle ranches with ...antelope, wild sheep or goats should be discouraged”</p>	<p>Heuschele and Reid (2001)  Heuschele (2002)</p>